THE IRON TRADE REVIEW

A JOURNAL OF THE IRON, STEEL, MANUFACTURING AND TRANSPORTATION INTERESTS OF THE CENTRAL WEST.

VOLUME XXI. CLEVELAND, O., JULY 26, 1888. NUMBER 31.

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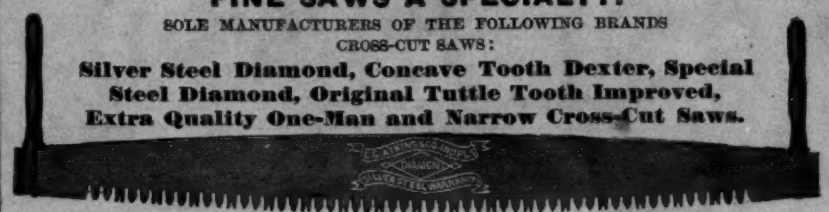

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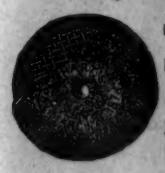

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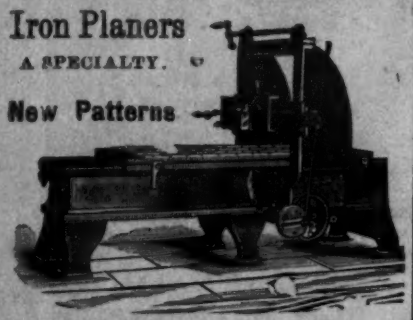

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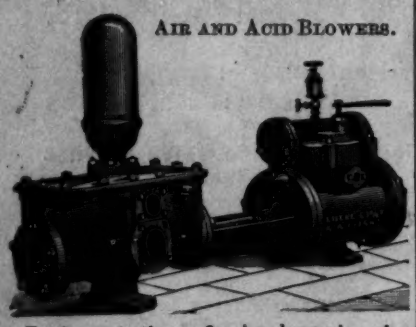

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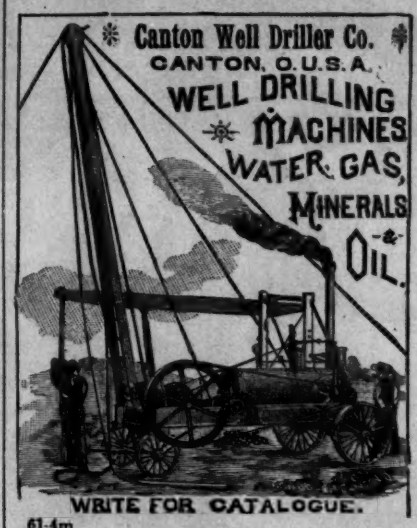

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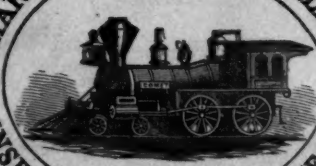

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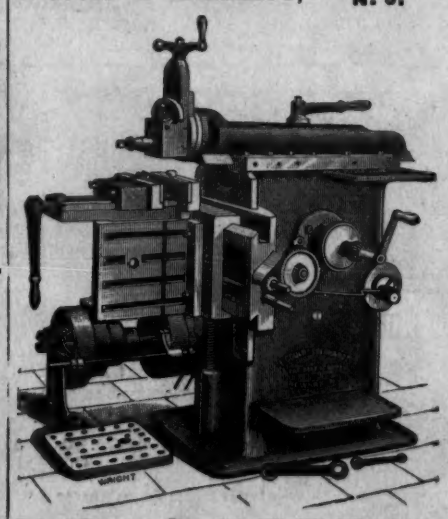

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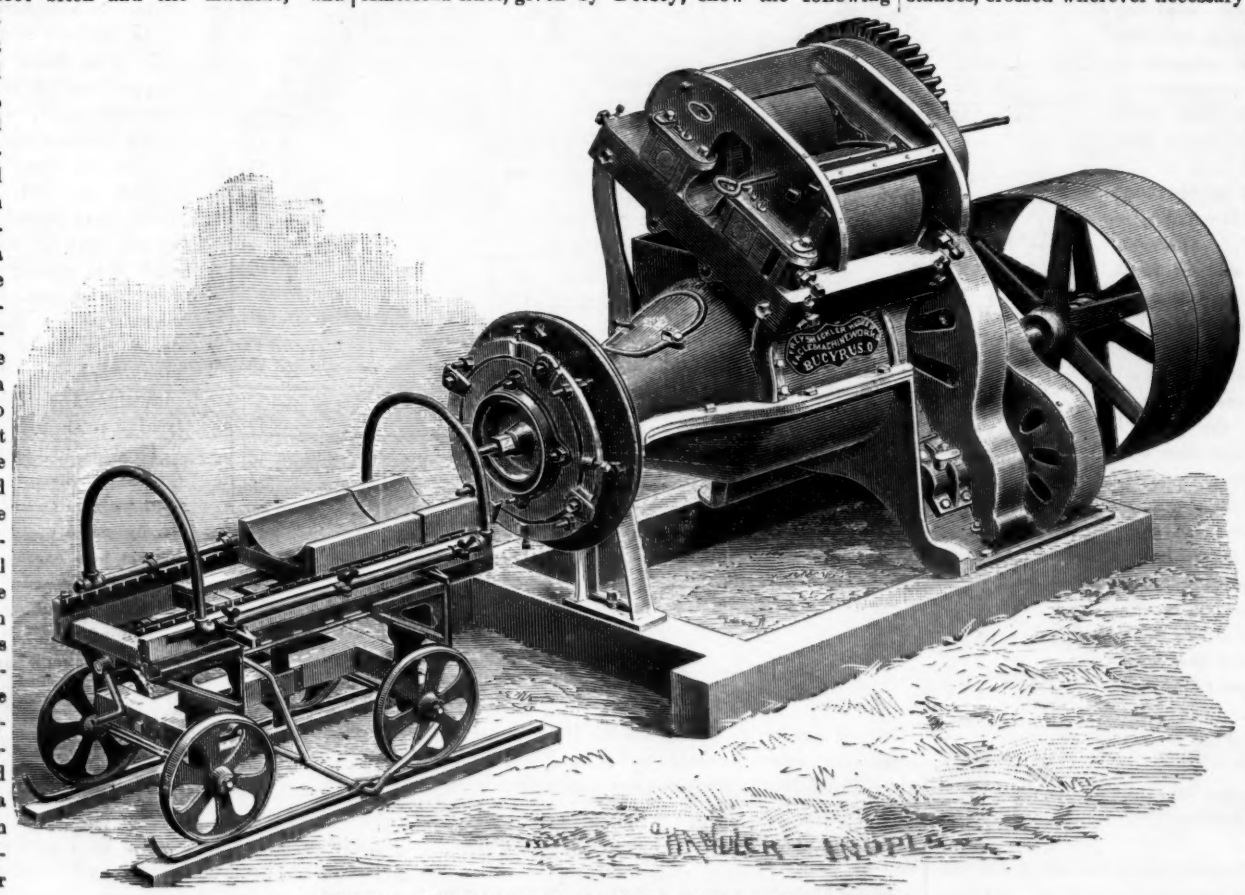
VOLUME XXI. CLEVELAND, O., JULY 26, 1888. NUMBER 31.

NEW BRICK-MAKING MACHINE.

The great activity in the brick and tile business has stimulated the inventors and makers of machinery to produce this class of ware, so that the present machinery introduced into the market, and herewith illustrated and described, shows a long step forward in this industry. The cut shows one machine of a class lately patented and introduced by a firm (manufacturing a full line of clay-working machinery) whose name we give below. We shall endeavor to furnish illustrations and descriptions of the different machines manufactured by this firm from time to time, and feel assured of the benefit our clay-working patrons will receive therefrom. The following machines for the manufacture of brick, tile and hollow-ware are now made by this one firm: Frey's patent Acme special brick machine, Frey's patent standard Acme brick and tile machine, the Centennial Tiffany brick and tile machine, the Mascot brick and tile machine, and Eagle brick machines. The last named is a so-called soft mud machine, using moulds and soft mixed clay. The four first named are the well known augur machines, expelling the clay in a stiff plastic state through dies, in order to form the various wares. As the clay is stiff enough to allow the ware to be handled without marring, and the brick to be baked eight high from the machines; the advantage of this will be readily seen. The illustration herewith shows the Frey's patent Acme standard brick and tile machine, as arranged for making eight-inch drain tile, and combined with a roller crusher on top. This combination of a crusher on the machine is not necessary in many clays, especially where fire clay is sed, which has gone through a dry pan and pug mill. In order to facilitate the opening of this machine to examine and clean the inside, hinges are provided, which allows the top, crusher and all to be tilted back. No other machine now in the market possesses this feature.



FREY'S ACME STANDARD BRICK AND TILE MACHINE.

The shafts are all of forged steel, and the gearing of the best charcoal iron. In connection with this machine, various cutting tables are furnished, adapted for the work. The board delivery cutting table, which is shown in the advertising pages of this journal, has now supplanted nearly all other devices for making fire-brick, as well as common. It needs only to be seen to be appreciated. Twelve bricks are cut at one pull of the lever, and put on boards for handling them. Besides this brick-cutting table, several others, both for side and end cut brick, are furnished.

The most important addition, however, has been added during the last twelve months in the Niedergesan patent lubricating brick die, of which the firm we are speaking of has obtained the sole control. With this die, the great objections and difficulties in moulding ware with sharp corners has been done away with. It also prevents laminations in the clay, because there is an even and easy flow of clay through the die, it reduces the friction and saves power. The nicest and most economical feature of it, however, is, that it is always the same size and never wears out. Friction clutch pulleys are put on most of these machines, and force feeds in the hoppers.

For further information see advertisement on page 520, and send for general and special catalogues, to Frey, Sheckler & Hoover, of the Eagle Machine Works, Bucyrus, Ohio, manufacturers of full factory outfits, including engines and boilers.

American and English Locomotives.

The statistics of ten leading English and ten leading American lines, given by Dorsey, show the following results: 1. The cost per year of the rations, wages and fuel of an American locomotive is $5,590, of an English locomotive $3,080. 2. Average yearly number of train miles run by an American locomotive 23,980, English locomotive 17,539. 3. Yearly earnings American locomotive $14,800, English locomotive $10,940, although English freight charges are much greater than those of the United States.—[T. C. Clark, in Scribner.

From the above it appears that while the expenses of the American locomotive exceeds the expenses of the English locomotive 81 per cent., it does 93 per cent. more work. This disparity would be largely increased if the conditions could be equalized. American locomotives on English straight and solid roads would show an increased efficiency, and English locomotives on American crooked roads would go to the hospital much oftener. This latter experience has driven the English locomotives off the lines in Canada, Australia, Mexico, South America and many continental lines.—[Power & Transmission.

STEEL IN FOUNDATIONS.

The use of steel rails for the foundations of large buildings has long been followed in the spongy soil of Chicago. Some of the most recent large structures have combined the use of steel beams with rails, notably the Edison Electric Light Company's building and the great auditorium in which the National Republican Convention has just been held. The Tacoma building, now being erected on the corner of Madison and La Salle streets, under the direction of Holabird and Roche, architects, is the first to use steel beams exclusively for foundations. This building will be 12 stories and an attic in height, and is intended for offices. Its walls will therefore be very massive, and the partitions will be supported on large pillars built up from the ground. The foundations for the walls and pillars consist, first, of a bed of concrete two feet thick; second, of steel I beams of different dimensions, according to circumstances, crossed wherever necessary; and third, of cast iron plates in the case of columns. The beams stand on edge, are placed close together, and are long enough to extend from 6 to 7 ft. outside the columns. They are enveloped in concrete after being placed in position, to guard against oxidation, and also to secure further rigidity. Over 120 tons of steel beams will be required for the foundations alone of this building. They were adopted in preference to steel rails, because their aggregate cost is about one-third less, as several tiers of steel rails would have to be used to secure the stiffness of the beams, more than covering the difference in the cost per ton. The above particulars are obtained from the *Iron Age* (New York).

Swedish Iron.

The Gothenburg iron masters had a very bad time of it last year, and business has not improved recently. The price of nail rods has fallen from six to less than five-and-a-half kroner, a price which was actually less than the cost of production. The decline that has taken place of late in the price of Swedish iron must be attributed chiefly to the fact that the demand has decreased through the introduction of Martin and Bessemer processes. Swedish Bessemer steel, which used to be exported formerly in considerable quantities, has been almost driven out of the Sheffield market, and many of the works are now devoted to the production of Martin steel. The total quantity of iron and steel exported in 1887 amounted to 112,569,205 kilos., of which no less than 76,900,253 kilos. were shipped to the United Kingdom of Great Britain.—[London Iron & Steel Trades Journal.

THE GREAT BOILER EXPLOSION AT FRIEDENSHUTTE.

The Locomotive.

At the request of several members of the *Union of Societies for the Inspection of Boilers in Prussia*, a general meeting of the whole Union was held at Berlin last February, to investigate the terrific explosion of twenty-two steam boilers which occurred at Friedenshutte, in Upper Silesia, on the 25th day of July, 1887, of which a short notice appeared in our April issue. The Prussian government was also represented by officials from several departments.

Two papers were read upon the subject, one of which was compiled by the engineers of several Rhenish boiler inspection companies, and the other by engineers of companies working in the north and east of Prussia, which differed only in some matters of minor detail. The assembly, therefore, appointed a committee of six chief engineers to compare the two reports and draw up a new one embodying the essential points of the two, to be sent to government officials, the various industrial or technical journals, and reputable daily newspapers. This committee consisted of the following named engineers: Weinlig, of Madgeburg; Eckermann, of Hamburg; Bocking, of Dusseldorf; Vogt, of Barmen; Munter, of Halle; and Emundts, of Gladbach. The following is a synopsis of their report for which we are indebted to Herr Minssen, of Breslau, editor of the *Journal of the German Boiler Inspection Societies:*

The terrible accident at Friedershutte stands without a parallel in the history of boiler explosions. Neither German, American, nor English statistics show anything approaching in magnitude and destructiveness the huge catastrophe in Upper Silesia. A consideration of all the facts in the case leads inevitably to the conclusion that the explosion was not due to the causes which ordinarily bring about boiler explosions. Before entering into a discussion of the explosion, we must say that there was no fault to be found with the inspection or management of the boilers. We make this statement here in order that we may not be misunderstood when we after wards speak of defects of construction and in the gener l arrangement, for the explosion was partly due to this and partly to defects or conditions arising sudden] and not visible after the explosion. The investigation of a single boiler explosion often involves much trouble in the search for details, an in this case is rendered much more difficult by the fact that the fragments of the different boilers could not be identified. Portions of some of the boilers could not be found at all. All of the details of the disaster will certainly never be known; it is without precedent, and all that can be done is to give a reasonable explanation that accords with what facts are known.

The boiler-house at Friedenshutte contained twenty-two steam boilers, which were arranged in one continuous battery, side by side. They were all precisely alike. Each consisted of an upper cylinder, 1,570 millimetres (61.8 inches) diameter, and 12,550 mm. (41 ft. 2 in.) long, and two boiler cylinders 785 mm. (30.9 in.) diameter, and 11,765 mm. (38 ft. 7.2 ins.) long. These lower cylinders were connected with each other by one neck, about 20 inches in diameter, near the front end, and each was connected to the upper cylinder by two similar necks a few feet from the ends.

The plates of the upper shells were 13 mm. (½ in.), those of the lower shells 8 mm. (5-16 in.), and those of the necks 11 mm. (7-16 in.) thick.

The upper cylinders were supported in the usual manner by wrought-iron brackets resting upon the side walls of the brick-work; the lower ones rested, one upon three, and the other upon two iron chairs.

The pressure allowed was 75 lbs. per square inch (5 atmos.). With the above thicknesses of plates, this was not excessive.

The boilers were all connected to one main steam-pipe passing over them by copper pipes, which were furnished with self-acting steam valves of 156 mm. (6⅛ ins.) diameter, and two safety-valves of 85 mm. (3 5-16) diameter, as shown in Fig. 3.

The feed apparatus was the same for all boilers, there being two pipes with check-valves in front of each boiler, in the ordinary manner.

The flues were arranged as they usually are with the boilers of this type. At the rear end of the battery a large flue received the gases from all the boilers and carried them to the chimneys, of which there were two. Near the middle of this flue was a division wall, causing boilers Nos. 22, 23, and 1 to 7 inclusive, to discharge into the northern stack, and 8 to 20 into the southern one. (See Fig. 1.)

The boilers were all fired by high furnace gases, distributed from an iron pipe to all in the same manner, by smaller vertical pipes to each boiler. Besides this, there was a double grate, each 1,885 mm. (6′ 2″) long, and 940 mm. (3′ 1″) wide beneath the front end of upper cylinder. The furnace gases were introduced above this grate, on which was kept continuously just sufficient fire to ignite the gases as they entered. The amount of coal-dust burned for this purpose did not exceed from 2 to 3 lbs. per square foot of grate surface per hour, so that two men and a boy were sufficient to do the firing and attend to the water in all the boilers.

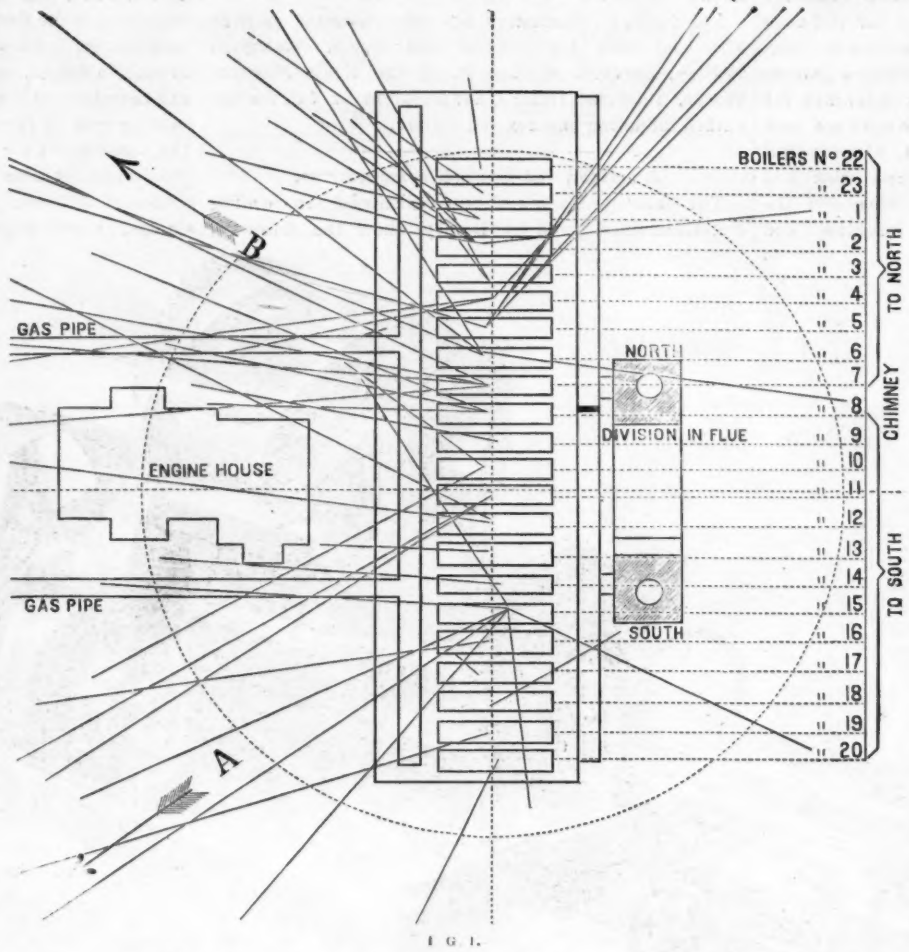


FIG. 1.

Steam was required only for the blowing engines, and some other minor purposes, so that eighteen boilers were always sufficient to do the work; four boilers were therefore always out of use for cleaning and repairs. Shortly before the explosion, Nos. 1, 3, 16 and 20 were blown off and were empty.

The feed-water was, as it is apt to be the case in coal districts, bad for boiler use. It made a bad scale, which became detached, and, falling to the bottom of the boilers, formed a deposit which caused some pitting of the shell-plates. The analysis of the water gave the following result:

Silicic acid	.0300	grammes.
Iron oxide	.0160	"
Lime	.2624	"
Manganese oxide	.0540	"
Sulphric acid	.3698	"
Chlorine	.0139	"
Organic matter	.1200	"

The feed apparatus was of sufficient capacity, and in good order.

Twenty of the boilers were built in 1872. The plates were of iron. It is well known that iron plates made from 1871 to 1873 lack the elasticity and ductility essential in boiler-plates. They were very brittle, and tests made on fragments of the exploded boilers showed a quality much below the usual standards, although it is impossible to ascertain how much the plates had deteriorated by their fifteen years' use day and night.

For fifteen years, day and night, the boilers had run without interruption, until, at half past 12 o'clock, on the night of July 25, 1887. the twenty-two boilers, including the four empty ones, exploded without any warning whatever. The boiler-house was completely demolished; and several small houses in the vicinity, occupied by the workmen, were set on fire by red-hot bricks, which were scattered over their roofs.

The three firemen were instantly killed, nine more workmen were so badly injured that they died three days afterward, and thirty other men and women were more or less severely injured, but recovered.

The heap of ruins was so vast and chaotic that the discovery of every detail of the explosion was impossible, although the investigating engineers examined every piece of iron which was found during the clearing away of the debris, which work required several weeks to accomplish.

Low water at the same time in eighteen boilers cannot be considered possible. It is not at all probable that the pumps did not draw, or that five pumps, of which three were continually working, would all fail at once, nor could it occur in so many boilers all at once by leaking seams or unusally great evaporation, without being discovered.

A soft blue annealing color, which showed itself upon some plates of boilers 6, 7, and 12, was found, but only upon single plates of these boilers, and in no instance extended over the whole surface of the plates. To find it at all, it was necessary to scrape off the oxide of zinc with which the plates were covered; the inner surface of the plates and the fractures through them did not exhibit the blue color at all. All things considered, low water as a possible cause of the explosion cannot be considered.

An excessive steam pressure could only arise when the engines were stopped and the firing of the boilers was continued, with all thirty-six safety valves stuck fast to their seats. And in this case, with the blowing engines stopped, the flow of gas would have ceased, and the pressure would have to be raised by firing with coal alone; and as we have seen, the amount of coal used was so very small, a dangerous pressure could not have been reached for many hours. There can be no plausible explanation of a dangerously high steam pressure.

There is still to be considered the question whether the catastrophe would not have been brought about, if, by chance, one or two of the boilers had exploded from the ordinary causes.

There is no doubt that, by the explosion of one or two of the boilers, a violent shock and a destruction of the large main steam-pipe would have occurred, and we must suppose there could occur a sudden discharge of pressure from the other boilers, in consequence, and their explosion might follow as a result. But this is not probably. Each boiler was connected to the main steam-pipe by a pipe six inches in diameter, through which the steam would have to escape; and experience shows that the sudden opening of a pipe of this diameter in a boiler having the amount of steam and water room of those under consideration is not sufficient to produce any serious disturbance. Besides, it must be considered that the upper cylinders flew in a direction just opposite to that which they ought to have taken had the explosion occurred in this manner.

Official statistics of boiler explosions in Germany show, of fifty-seven explosions of boilers of the same type of construction as those at Freidenshutte, eighteen boilers exploded in batteries, and in only one case did the explosion of one boiler cause the explosion of a neighboring one, the number of boilers in the batteries ranging from two to ten.

All things being considered, we must believe that the accident was caused by the use of the furnace gases for heating the boilers. An explosion of these gases, either alone or mixed with gases from the coal used, is the only thing that could produce the effect shown by the direction of flight of the boilers. We should not think the effect of the exploding gases would be so serious were

we not convinced that the construction of the boilers was favorable to it and the materials of bad quality.

The furnace gases burn all along the flues, so that there are no really well defined furnace plates. This gives rise to great expansion and contraction in different parts of the boiler, which is manifested by cracks at girth seams, etc. The construction of such boilers is also inherently defective, and they are, fortunately, fast going out of use.

The fan-like form of the direction in which the fragments of the upper cylinders were thrown, the manner in which the flues were destroyed, the front side of the main flue between the chimneys being squeezed against the back wall, and the top blown off, all show that the active agent was a force acting from a center between the two chimneys. This could be nothing but an explosion of the furnace gases mixed with gases from the coal.

The composition of the gases from the Friedenshutte furnace is estimated as follows:

Nitrogen	63	per cent. by val.
Carbonic oxide	34 3	" "
Carbonic acid	.6	" "
Hydrogen	1.4	" "

on the authority of Bunsen, Ebelman, Schurer. etc.

Jung, of Burbacher-Huette, gives their composition as follows:

Nitrogen	60	per cent.
Carbonic oxide	24	"
Carbonic acid	12	"
Hydro-carbons	4	"

and says: "The greater the amount of carbonic oxide, the greater the value of the gases for heating purposes."

Lurmann, a well-known furnace engineer, says, furnace gases are "difficultly burning," and warns against trying to burn them and coal together.

The furnaces at Friedenshutte blew grey Bessemer iron.

The gases are very rich in carbonic oxide, and poor in carbonic acid.

By stoppages, for instance, at drawing the furnace, by sudden shutting down of the steam engines, or by simultaneous opening of the furnace lids, the flow of gas under the boilers might entirely cease and the flames be extinguished. When the flow again begins, unburnt gases enter the flues, air enters through the grates, fire-doors, cracks in the brick-work, etc., and the explosive mixture is formed, and only waits ignition, which occurs sooner or later.

During the hour from 12 to 1 at night there was a pause for taking supper, as for dinner at noonday Very likely, at this time an extra thick layer of coal-dust was put upon the grates, or the flames were extinguished after the coal was burnt out. After mixing of both sorts of gases, from the furnaces and from the coal, it would be quite immaterial where the ignition of the mixture began, or whether several explosions occurred at once, or only a single one in several flues.

In either case, if a gas explosion occurred, the effect upon the boilers would be the same. The thrust from underneath the upper cylinders would first break the middle of the boiler and, simultaneously, the rear connecting leg, thus separating the upper from the lower cylinders, the upper boiler rising at its rear end and turning on the forward connecting leg, would be projected forward, upside down. This was exactly what occurred in this case.

It is not our purpose to criticize the use of furnace gases as fuel for boilers, nor to condemn the above-described arrangement, for it is only in very rare cases that there would be a coincidence of all the dangerous conditions, as at Friedenshutte. Other and better constructions than these, which do not allow of the extinguishment of the gases, are well known and appreciated in German iron districts.

In short, we may sum up the results of our investigations in the following words:

By an unfortunate coincidence, an explosive mixture of gas and air formed in the boiler flues, and suddenly ignited. The effect of this gas explosion was a local rupture of some parts of the boilers which was easily effected in consequence of the great length and inferior construction of the boilers, and the bad quality of the materials. The explosion of the gas worked the lifting and breaking of the boiler shells, which resulted in the tremendous explosion and devastation of the whole boiler-house.

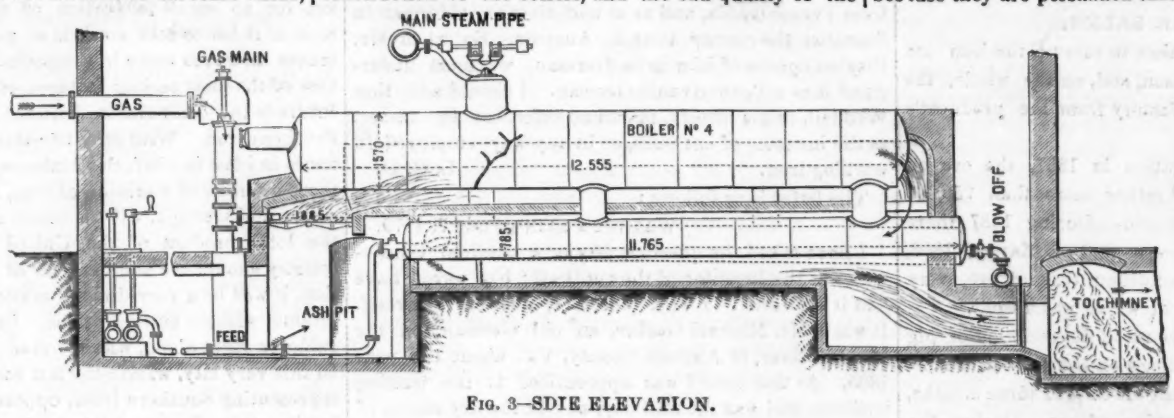
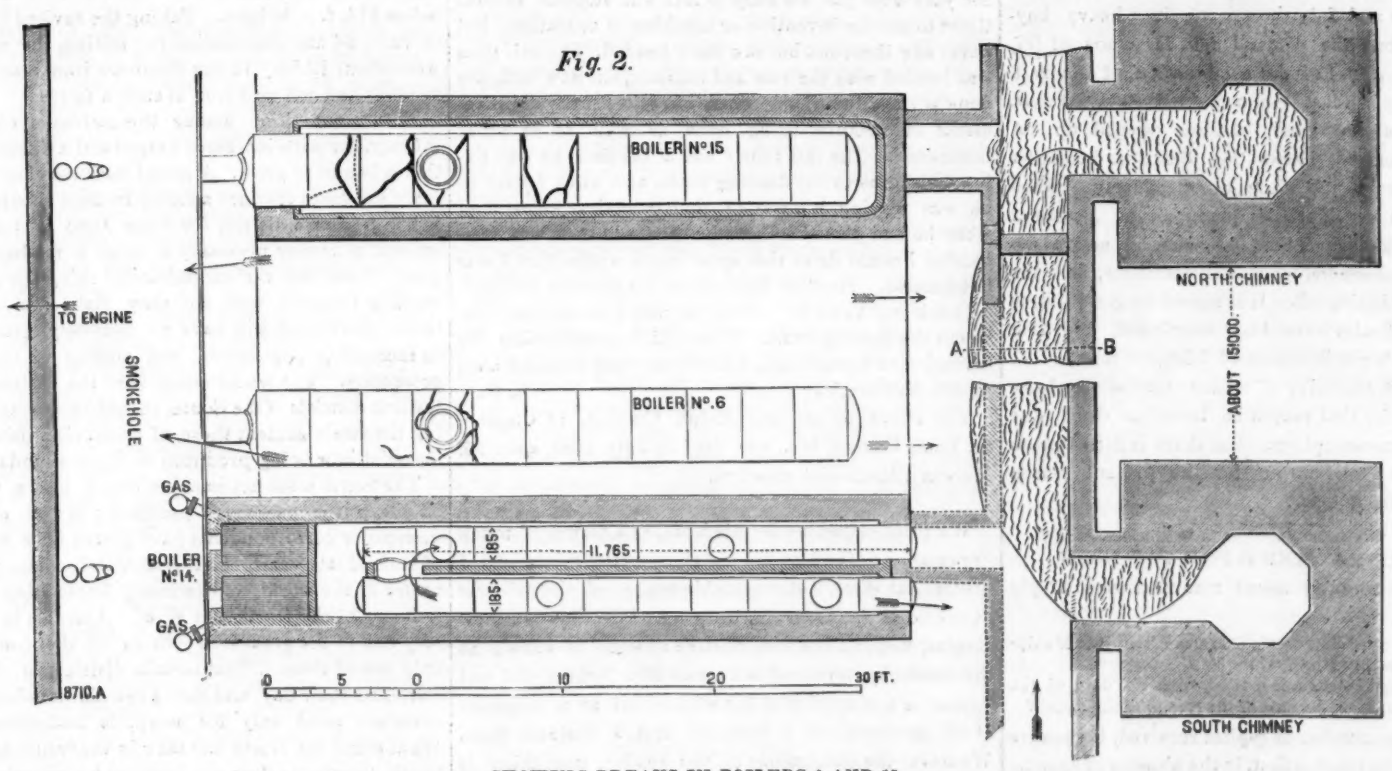


FIG. 3—SDIE ELEVATION.

Fig. 2.



SHOWING BREAKS IN BOILERS 6 AND 15.

The World's Steel Production.

The production of Bessemer steel in the eight chief iron and steel producing countries of the world amounted last year to 7,269,767 tons, as compared with 6,034,115 tons in 1886, showing an increase of 1,260,094 tons, or 20 per cent. The production of open-hearth steel in the same countries in 1887 was 1,672,340 tons.

AN iron plant will be established at Ontario, Cal.

THE LABOR-SAVING AGE.

Some interesting experiments have been made near Sheffield, England, with a new machine for mining coal, says the IRON TRADE REVIEW. It consists of a hydraulic press, operated by water, supplied through a small hydraulic pump. The coal is not shattered as in blasting, but is firmly and gradually forced forward with very little dust and no slack. Ten to twelve tons are brought down at each "shot," occupying but a few moments of time and the labor of two men.—[Bradstreet's.

The foregoing is one of the many items in the progress of this remarkably progressive age. Yet how many who read it will consider the effect of an improvement of this character upon other than the cheapening of fuel. How many outside of the ranks of the workingmen concerned will "put their thinking caps on" and regard the miners who may be thrown out of the work they have been brought up to by a device of this character, and as to where they may be able to place themselves to earn subsistence in other walks of life. Of course it is a recognized fact that improvement is for the betterment of all, but this does not relieve the men who suffer for the time of the hardship of that suffering. No doubt the cheaper fuel would make other avenues of labor; no doubt improvements in processes and machinery tend to more comforts for the industrious, but the transition condition of the men directly affected, until they secure other and congenial employment, is none the less hard merely because they are persuaded that all these things are for the best.

It would be interesting as a contribution to economic statistics were it known exactly the classification, etc., of the Edgar Thomson steel works men who have lost their jobs in five years through improved machinery and processes; what grade of labor; what became of them, &c. The world certainly owes a duty to workmen who are shifted "from pillar to post" by reason of improvements; a duty that should amount to something more tangible than sympathy. When they are cut off from their accustomed employment there is something less inhuman than the doctrine of "the survival of the fittest" that should be exercised.—[National Labor Tribune.

California is like every other place. The San Francisco *Report* says: "If a man come hither without capital and unprepared to wait, or if he be poorly equipped with knowledge or handicapped by bad habits, he will find the fight for life as hard here as anywhere, and harder."

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

CLEVELAND, O., JULY 26, 1888.

IRON ORE SALES.

It is not too early at this time to sum up the iron ore situation for the present season, and, on the whole, the result cannot be called satisfactory from the producer's standpoint.

On the opening of navigation in 1887, the ore on Lake Erie docks aggregated rather more than 250,000 tons, of which one-third was sold. During 1887 there was mined an overplus of ore, so that on May 1, 1888, there was on hand nearly a million tons of ore, very little (perhaps 10 per cent.) of which was unsold.

This fact, together with the rapid depreciation of pig stocks and the lack of confidence on the part of furnacemen, resulted in a delay in the ore sales of three months, despite the material cheapening of ore. During the months of June and July there was quite a heavy buying movement, but the demand fell far short of '87, principally on account of the combination of the railway interests as against the combined steel interest. When both sides grew tired, business opened up. A canvass of the market shows that Bessemer hematites are practically sold up, while the producers of hard ores have still considerable quantities of Bessemer grades on their hands. There has been an active demand for non-Bessemers, which still continues, but the quantity sold is falling off. It is agreed by good judges that the heaviest sales have been concluded, and that the ore covered is not in excess of 2,500,000 tons.

This amount is exclusive of western markets for Lake ore, and cannot for that reason be taken as conclusive as to the entire consumption. But there is little reason to expect that the total output for the present season will exceed 3,500,000 tons.

TERMS OF PAYMENT FOR PIG IRON.

The *Iron Age* recently asked manufacturers of pig iron :—

1. Does four months' time on pig iron mean from date of shipment or date of receipt of the iron ?
2. If cash discount is taken, is it taken from the date of the furnace shipment or from the date of the receipt of the metal ?

From the large number of replies received, it appears that the general opinion is that, in the absence of specific arrangement, the notes and discounts are to be taken from the date of shipment from the furnace. "Circumstances alter cases," however, as in the case of Southern furnaces, where it takes ten days or two weeks for pig iron to arrive at its destination. In such case notes are dated from receipt of iron; otherwise, if for near-by points, the notes are dated from day of shipment. A Chicago firm has three methods on time sales, viz.: Four months from date or shipment from furnace or agreed point of shipment. Four months from arrival of the cars at point of delivery. Four months from delivery in the yard or at the works of the buyer. Each method is settled at the time of sale. On cash sales they have two methods, viz.: Sharp cash, which is immediately on arrival at point of destination. Cash 30 days, which is cash within 30 days of arrival at destination. In both cases a delivery at point of destination is made before payment is due unless specially agreed to contrary at the time of sale.

Perhaps the best form to use in making quotations is this, from another Chicago house: "Terms—all freights paid by consignee. Metal, four months' note or acceptance from day of shipment. Cash discount of 50 cents per gross ton on prompt receipt of metal at destination."

WHO MADE THE FIRST CUT NAILS?

We are in receipt of the following interesting and valuable communication from Mr. L. C. Draper, Corresponding Secretary of the State Historical Society of Wisconsin, under date of "Madison, July 17":

To the Editor of the IRON TRADE REVIEW:

I send you the enclosed, giving an account of the first cutting of nails, by Michael Garber. I have made a little explanation in red ink about the writer. I had some correspondence with him about some old historical matters, and he enclosed this scrap to me. You may get an item out of it—an important one if true, and I have no reason to doubt it. Very truly yours,

LYMAN C. DRAPER.

P. S.—On reference to Waddell's Annals of Augusta Co., Va., I find Michael Garber's name mentioned, as having settled in that county between 1785 and 1790, from Pennsylvania, and as at one time an alderman in Staunton, the county town in Augusta. So when Mr. Clayton speaks of him as a German, we must understand it as a Pennsylvania German. I should add, that Waddell, in his history, makes no reference to Garber, as the inventor of cut nails, or in any way employed in working iron. L. C. D.

The letter is as follows:

WALNUT PLAINS, June 7, 1879.

I have asked the question fifty or a hundred times—who was the inventor of the cut nail; but never have had it answered. I will, therefore, answer it myself. It was a Mr. Michael Garber, an old German, on the Middle River, in Augusta County, Va., about the year 1805. At that time I was apprenticed to the tanning business, and was the mill boy, and in the dry season of the year went past his shop to mill and stopped several times to see the invention or machine in operation, but never saw them cut, but saw them headed. The nail then was headed with the vise and hammer, but now both are done at the same time. There have been many improvements in manufacturing nails as well as in other inventions. The last time I was at his shop he was fixing a machine to cut flooring brads, and when I went in he was placing a piece of timber against a post, and when he had placed it there he then said if I was left-handed I could drive that spike in. I replied that I was left-handed. He then handed me the hammer and said, "Thank you to do it." I did so, and with that machine he cut the flooring brad. Thus, old Augusta claims the invention of the cut nail, and the mowing machine also, by Mr. McCormick. R. C.

The above writer was Ralph Clayton, of Clayton, St. Louis County, Mo., who died in July, 1883, aged 95. He was a Methodist preacher.

WE print elsewhere in this issue, as a matter of much importance to the iron ore and transportation interests of the Central West, a stenographic report of the address delivered at Sandusky, O., July 14, 1888, by Matthew Robins, Esq., of London, relative to what is known as the Sandusky terminal scheme. Mr. Robins did not appear as a champion of the scheme but as a defender of his own credit as a financier and a business man. Whatever the conclusions of the reader, one thing is evident: that Mr. Robins clears himself most effectively of all attacks on his credit, while at the same time he gives some very convincing reasons, based upon thorough investigation, for believing in the feasibility of the project. The proposed enterprise is one that should be discussed on its merits, in the light of past experience and the probabilities of the future; and it is to be regretted that anyone should be found willing to attack the standing or impute the motives of gentlemen connected, or about to be connected, with it. In the interest of fair play—which is, we would have Mr. Robins believe, a part of the creed of every true American, as it is of every true Englishman—the IRON TRADE REVIEW takes pleasure in printing the address in full

COST OF SOUTHERN AND WESTERN IRONS COMPARED.

In a series of recent articles on the Iron District of Alabama, the writer has endeavored to take an impartial view of the situation, and to determine as accurately as possible, the probable cost of pig iron there. The conclusions he reached were that as far as the past was concerned, the cost had exceeded that, often-times reported in newspaper articles, but, that with methods now employed, and with the great natural advantages enjoyed by Birmingham, it was not only possible, but probable, that the larger corporations owning ore and coal lands in close conjunction with extensive modern blast furnace plants, would make pig iron at the following cost :

2¼ tons of ore @ $1		$2.50
1¼ " coke @ $2		3.50
½ " limestone @ $1		.50
Labor, per ton	$1.75	
Repairs	.50	
Sand	.10	
Supplies	.15	
General expense	.10	2.70
		$9.20

Even on this low cost there is a possibility of making a reduction, by the use of better coke. This low cost will be increased to $10.00 to $12.00 per ton in other localities, more remote from coal and ores, or using more expensive ores.

As heretofore stated, the great drawback to the pig iron business in the South, is that there is a home market for so small a portion of the output, and that most of it has to seek markets at greater or lesser distances, and then come in competition with other irons. One of the most serious features of trade in the near future is the competition between different makes of Southern iron. With only two-thirds of existing furnaces in blast in 1887, the Alabama output alone will be three-quarters of a million of tons, and joined to Tennessee and Georgia, will represent at least one-sixth of the total product of the United States. Unless the country should see another year of very large consumption, it will be a very difficult matter to dispose of this product without cutting prices. In fact, this has been going on right along, where round lots were involved. In this very city, within the last month, two salesmen, representing Southern irons, opposed each other, resulting in a sale of a round lot of No. 3 iron, at a price below $14, f. o. b. here. Taking the revised freight list of June, $4 and commission for selling, the net results were about $9.50. Is any Southern iron master willing to make and sell mill iron at such a figure?

This competition among themselves is only in its infancy, for with increased output and a sluggish market this is bound to grow. A sound business view unhesitatingly indicates that not another furnace should be built in the Alabama district for some time to come. The amount of money necessary to erect a modern furnace plant, if put into various industries using the product of existing furnaces, will not only yield a steadier and larger return, but will have an infinitely greater effect in increasing population, and adding to the general prosperity. The whole energies of the business men of the iron districts of the South, should be devoted to securing the establishment there, of enterprises using the raw material now being produced in super-abundance.

The South must not imagine that it has a "corner" on cheap iron-making. Speculators in real estate and newspaper correspondents have gotten off a great deal of stuff of late years, about Alabama becoming the iron centre of the world, and seriously imperilling the iron industry of the North and West. Alabama is undoubtedly one of the great iron centres of the country, but only one of them. That certain districts in the North have had their day, and that a certain number of furnaces are good only for scrap, is undoubtedly true. What stand the North can take in the future against the South, the writer does not know, as his experiences have all been in the West, but he ventures to say, in passing, that the owners of the Cornwall ore deposit, near Lebanon, can successfully meet any competition, whether it be South or West, until "the crack of doom."

If we are not mistaken, Southern iron masters are just as much interested in getting figures of cost in the West, as we, in knowing what it costs them.

In estimating the cost at three points, Mahoning Valley, Cleveland and Chicago, the same care as to accuracy will be taken as in the Southern items of cost.

The current selling price this season, for many non-Bessemer ores, running from 57 to 60 per cent., metallic iron has been $3.50 at Lake Erie ports, and at this price many large sales have been made.

The rate to the Mahoning Valley is 70 cents a ton—

(to Youngstown as a centre, 67 miles.) Calling the ore 58 per cent.—$3.50+70c.=$4.20, or 7 25-100 cts. per unit of iron. We take a well-known furnace, 75x16—which averages from 140 to 160 tons a day, or an average fuel consumption of less than 1¼ tons of Connellsville coke.

In the ore mixture, 30 per cent. of mill cinder is used, at a cost of $2.50 per ton, averaging 50 per cent. iron or 5 cts. per unit. Present prices of coke, $2.50 per ton.

70 per cent. lake ore @ 7 25-100c	$5.07	
30 " mill cinder @ 5c	1.50	
1¼ tons of coke @ $2.50	3.13	
¾ " limestone @ 80c	.60	
		$10.30
Labor	1.25	
Repairs	.50	
Oil tools, etc	.15	
General Expense	.25	2.15
		$12.45
By using all ore, the additional cost		.68
		$13.13

The furnaces on the Cuyahoga River, at Cleveland, can do even better than this. A 58 per cent. ore can be delivered direct from the vessel into the stock house and yard @ $3.60, or 6.2c. per unit. Coke is $3 delivered.

All ore iron.

100 units @ 6.2	$6.20	
1¼ tons coke @ $3	3.75	
⅛ ton limestone @ $1	.50	$10.45
Labor	1.25	
Repairs	.50	
Oil, tools, etc	.15	
General expenses	.25	2.15
Total		$12.60

Chicago can get its ore somewhat cheaper, but its coke is $1 higher per ton:

100 units of iron @ 5.8c	$5.80	
1¼ tons of coke @ $4	5.00	
⅛ ton limestone @ $1	.50	
		$11.30
Labor, etc., as above		2.15
Total		$13.45

The South must bear in mind that in the cost of the ore, above stated, is in many cases included a royalty of from 30 to 40 cents a ton, a full rail freight from the mines to shipping port, at least 80c. from the shipping port to point of delivery, and a fair profit to the parties operating the mine.

In the South, in many instances, the ownership of mines and plants, is represented by the one capital, on which a proper dividend is sought by charging up all materials at cost.

The ownership of many non-Bessemer mines, in the Lake Superior district, at present prices, could be united with furnace plants, on a capitalization far below many of the Southern enterprises, and with the same system of charging, would show a much lower prime cost than the above.

In all the estimates given in the various articles of this series, no account has been taken of interest. This is necessarily a variable item, and the effort has been made to show, simply, the actual cost of material, labor and normal maintenance.

The labor account in the North has been placed considerably below that of the South, and its seems probable that this must always remain, owing to the marked difference in climate, and the character of the labor available. The cost of labor in the South, was given by those who ought to know—the figures for the North are above the actual figures in a large number of cases.

If the cost accounts heretofore given, are materially correct, the following conclusions seem to fairly follow:

That the Southern iron makers hold a certain territory, absolutely, subject only to competition among themselves, either by reason of over-production, or the ability of certain makers, to produce iron cheaper than others, and that their true policy is to develop to the largest possible extent, the use of their raw material, within this area; that another section is neutral ground, in which they must meet Western iron in a competition, going more and more against them as their freight rates increase, or the prime cost of Western materials decline.

That the West must recognize that a new and most powerful competitor has come to stay, and that, in the future, as far as non-Bessemer irons are concerned, excessive royalties on ores must be reduced, that low rates for transportation from the mines to the furnaces, must be permanently maintained, and that all available economies in mining and manufacturing must be practiced. In each section, such prices may be established as will properly remunerate the maker, and yet be just and most attractive to consumers. The rapid natural increase in population will soon catch up with present capacities for producing, and South and West will be profitably busy in supplying the wants of those properly dependent upon them. E. C. PECHIN.

CLEVELAND, July 25, 1888.

Sheet Iron Bands for Locomotive Boiler Lagging.

Railroad Gazette.

It is the general practice to allow the lagging of a locomotive boiler to rest on wooden bands, strapped tightly around the barrel of the boiler. These bands often give considerable trouble by being burned, and sometimes are the cause of the destruction of the whole lagging. To overcome this difficulty Mr. J. H. Vreeland, Master Mechanic of the Eastern Division of the New York, Lake Erie & Western, hit upon an excellent device of making the bands of channel iron section resting on the plates, clamped to the boiler, and thus presenting a smooth, flat surface, on which the lagging is allowed to rest.

It is claimed that the expense of making and putting these iron bands on the boiler is less than that of wooden ones. They are made of the iron used for the jackets and may be made from iron jackets taken off old engines. Strips of sheet iron are cut, whose width is such as to make the band, when finished, about one to one and a half inches wide, with flanges of sufficient depth to raise the outer surface of the bands above the rivet heads. These strips are then very easily and quickly rolled to the form of channel iron, and curved to suit the diameter of the barrel. In order to allow for the difference of the outside and inside diameters of the bands, the flanges are somewhat crimped in rolling, but this in nowise detracts from the usefulness of the band. These bands have been in use for about six or seven years, giving great satisfaction. While the use of iron bands is not entirely new, they confer several advantages, being more durable than wooden bands, and not only is the danger of setting fire to the bands averted, but they will hold a portion of the lagging in position after a portion has been burned. Experience has demonstrated the fact that, with the use of iron bands, the lagging will last longer, and gives less trouble, than when the old-fashioned wooden ones are used.

Echo of the Triple Thermic Motor.

Boston Commercial Bulletin.

When the incorporators of the Triple Thermic Motor Company left Lowell some months ago, after founding a company with a capital of $25,000,000, they left the Blue building in Jackson street, which they had promised to purchase of Warren Aldrich, a resident agent, for $20,000, and all the machinery with which they were experimenting, on the proposition to furnish power at considerably less cost than steam is produced. Mr Aldrich has paid taxes on the engines, boilers and other property, which the projectors say cost them $50,000, and he was given, a short time ago, the right to use the motor power in Lowell, and to sell the rights to individuals.

About a fortnight ago he called a meeting of citizens known to be owners of the Triple Thermic Motor stock and submitted to them a proposition for purchase. This was referred to a committee, who reported at a large meeting of stockholders last week that their estimate of the value of the property was $25,975, and they would not recomend action toward its purchase. The report caused considerable discussion, and one proposition made to Mr. Aldrich that he accept some of the motor stock in payment. He replied that he had all the motor stock he cared to handle. He thought in offering this plant at a low figure to the stockholders a start would be made that would boom the stock.

It was ascertained by inquiry that Mr. Aldrich would not sell the right to run machinery in any portion of Lowell by the Triple Thermic motor process, but only in the building. If the duped investors in this scheme have a chance of realizing anything at all on their investment they should accept it without hesitation.

Colorado Iron Ore.

Most of the iron ores of Colorado are manganiferous, so no difficulty is experenced in securing the speigeleisen necessary for the manufacture of steel. Most of the low grade silver mines about Leadville possess inexhaustible quantities of ferrous manganese ore containine 6 to 20 per cent. manganese, and 10 to 40 per cent. metallic iron, together with 2 to 7 ounces of silver to the ton. Much of this class of ore, which upon test was found too low in silver to answer the purpose of iron, fluxing with the silver lead smelter, has been sent to the steel works, but the price realized has usually proved too small to admit of the regular extraction of the mineral for sale to the steel works. With proper equipments and large contracts this could, however, be done at a profit.

CAPACITY for heat increases by rarefaction.

LAKE SUPERIOR IRON NOTES.

Special Correspondence to the IRON TRADE REVIEW.

FLORENCE, Wis., July 23.—During the past shipping week the iron mines sent 178,724 tons of ore to market by lake, making the total shipments for the season, up to that time, 1,508,465 tons, a falling off of about 200,000 tons as compared with the corresponding period last year. The shipments by ranges are as follows: Marquette, 591,227, tons; Gogebie, 421,578 tons; Menominee, 388,783 tons; Vermillion, 106,877 tons. The Gogebie district is the only one that has excelled last year's figures. On July 20, 1887, the mines of the Gogebie range had shipped 368,392 tons less than were shipped up to the 18th inst. It is probable that at the end of the year, when the lake and rail shipments of ore are footed up, it will be found that the aggregate output of the district is about the same as that of last year. The Norrie and Colby mines both continue to ship at a very lively rate and their aggregate output will not fall below 500,000 tons. The Ashland and Aurora mines will swell this amount about 250,000 tons, and the other mines will ship, by lake, about 350,000 tons more. The grand total of lake and rail shipments will probably be between 1,100,000 and 1,200,000 tons.

The Chapin mine, which was the largest shipper last year of any single mine in the Lake Superior country, has been content, up to the present time, to head the list of shippers in the Menominee district, where it is located. The Republic mine, in the Marquette district, and the Colby and Norrie mines, in the Gogebie district, are all ahead of the Chapin. The Norrie, in fact, has about doubled the Chapin's record. Next to the Chapin mine, the Florence, with a record of 55,313 tons, is the largest single shipper in the Menominee district.

The Republic Iron Company expects to ship about 230,000 tons of ore this season.

It is quietly whispered that negotiations are pending for the sale of a large interest in the Dunn mine, Menominee district, one of the largest and most valuable non-Bessemer properties in the Lake Superior country, to German capitalists. The fact that the Dunn mine has recently been examined by experts gives color to the report.

Your correspondent is still of the opinion that the aggregate output of the iron mines of the Lake Superior Country will approximate 4,000,000 tons, divided by ranges as follows: Marquette district, 1,400,000 tons; Gogebic district, 1,150,000 tons; Menominee district, 1,000,000 tons; Vermillion district, 450,000 tons.

Making Our Great Guns.

Boston Commercial Bulletin.

Messrs. Binsse & Hauschild, of East Newark, have received the award of one-half of the gun lathes for the manufacture of the hoops of the steel 10-inch breech-loading rifle guns, the remainder to be awarded when these are completed. These guns are to form the armament of the men-of-war now building. The lathes are colossal. The six lathes for finishing the tubes are to be 130 feet long each; the three lathes for the jackets are 64 feet long each, and the seven hoop lathes are about 40 feet long each.

All these tools swing nine feet over the bed and nine feet across the bed. The hoop lathes will weigh about 100,000 pounds each. The main spindle bearing is 12 by 20 inches, and the face plate, 9 feet in diameter, will weigh about 10,000 pounds. The beds, two for each machine, will be about 40 feet long, in one piece, and will weigh about 15,000 pounds apiece. These lathes will have all the usual longitudinal and transverse motions, and besides, they are designed to turn and bore at the same time. The tools are to erected in the Washington Navy Yard.

Canadian Bounties.

The Dominion of Canada, in order to stimulate the development of its iron deposits, offers a bounty of $1 per ton on all pig made in Canada. In the coming session of the Dominion Parliament, an effort will be made by the companies owning Canadian copper deposits to secure similar legislation for the encouragement of copper smelting in Canada. It is intended to ask for a bounty on every ton of copper matte produced, assaying fifty per cent. copper or less, an increased bounty for higher grade mattes, and still more for bar copper, with a subsidy per mile for any railway built to connect copper mines with smelters or tide water.

ACTING unpon the arches of an iron bridge the sun's heat during the middle of the day has caused an elevation of an inch or more.

THE MANUFACTURE OF HOES AT PITTSBURGH.

The only hoe made in Pittsburgh, says the *Dispatch*, is what is known in the trade as the eyed hoe, which is used very extensively on Southern plantations and by the Swedes and Norwegians of Northern Iowa, Wisconsin and Minnesota. The one hoe manufactory of the city has developed a trade in this line in the past few years which reaches to 25,000 dozen annually. The same concern which turns out hoes has developed a very large trade in axes, and furnishes the bulk of the supplies in this line for the lumber regions of Michigan, Maine and Oregon. A recent interview with a representative of this ax and hoe industry called out the following statement concerning the present situation of the trade: "Our year's business is from July to July. We cannot claim that our trade for the year just closed has been fully up to the previous year. Labor troubles caused a stoppage of our works for a couple of months at the beginning of the year, and we have not been able fully to make up for lost time thus far. The trade of 1886-7 was very satisfactory and the volume of business with us during that period exceeded all former years. We could hardly hope to keep up such a trade in the face of general depression in iron and steel, tariff tinkering and a Presidential campaign. There has been a slight falling off, as was to be expected. Margins have also become alarmingly close, especially in hoes. There is so little profit in shank or garden hoes, that we do not think there is enough in this line to justify us in producing them. At Canton, Girard, Sandusky and Binghamton are extensive works employed in turning out fine grades of garden hoes, and in some instances they are produced by prison labor. We do not propose to enter into competition with this class of work, and have therefore surrendered the field to those who are willing to work for nothing and find themselves."

These higher grades of garden hoes, while the material out of which they are made is largely a Pittsburgh product, are put into shape for use at other points. The steel goes from here in its raw state, and returns in the shape of a hoe. The demands of this city in this line for its own immediate use reaches $20,000 yearly.

One hardware dealer alone reports sales of $7,000 worth of garden hoes which are manufactured outside of Pittsburgh out of material produced here. This ought not so to be. Many a laborer could be furnished employment, and many thousand which go to help other trade centres might be kept at home by working up our own materials for their ultimate use. There are a multitude of other articles beside garden hoes which are produced elsewhere from Pittsburgh's materials, and which ought to be made at home. The prospects for a fair Fall trade in axes and circular saws are considered good by operators here.

The busy season in this department is close at hand, and it is hoped that the last half of 1888 will make up for the falling off in the first half in the line of shovels, axes and saws.

Rivetless Steel Sleepers.

Mr. H. Hipkins, according to the *Colliery Guardian*, has invented a rivitless steel sleeper for railroads. The lips or jaws for holding the rail in place are stamped out of the solid plate; and are stiffened by corrugations or brackets which are also raised from the solid plate out of the hollow at the back of each jaw. A center strip is provided for the rail to rest upon, dispensing with all rivets and loose parts. These sleepers can be laid raqidly, and they are claimed to be especially adapted to use underground in mines.

TESTING MACHINES BEFORE DELIVERY.

The customary claims of some manufacturers. that "all work built at this establishment is subjected to the most severe tests, and any part found defective is promptly thrown out," is capitally "hit off" in the accompanying cut.* Nobody can find fault with the tests shown, that they are not "severe" enough, judging by the results. With such intelligent inspection and rigid rejection, it is safe to presume that the claim is well founded in the present instance, at least.

TESTING MACHINES BEFORE DELIVERY.

Shipbuilding Abroad.

In recent articles in the *Iron and Steel Trades Journal*, we referred to the feeling in shipping circles that the number of orders placed for new ships at the end of 1887 were in excess of the demand, and that a period of less activity would be felt during the first half of 1888. There has been a lull in the orders, but a new impetus has been again given, and several large orders have been placed with the builders on the Clyde and East Coast. A slight rise in freights is also reported, and altogether the renewed activity in shipbuilding may be lasting.—[Iron & Steel Trades Journal, Londou.

THE first line of railway in the Holy Land, which is to be constructed by a Belgian company, under a concession from the Sultan, will run from Jerusalem to Jaffa. It is reported that sleepers, telegraph wire, and rolling stock have already arrived.

*From the catalogue of Sterling Elliott, Newton, Mass., manufacturer of cutting-off machines, tap-drill gauges, stitching and tying machines, etc.

FREIGHTS ON IRON.

The Joint Committee of the Central Traffic Association and Trunk Lines have authorized a reduction of the iron and steel freight rates, which corresponds with the cut made by the Baltimore & Ohio between Pittsburgh and Eastern cities on June 26. The basis of the new tariff is 21 cents per hundred on carload lots, and 20 cents on cars from Chicago to New York. This makes the rates between Pittsburgh and New York 13 cents for carload lots and 16 cents for less; Pittsburgh and Philadelphia, 11 and 14, and Pittsburgh and Baltimore, 10 and 13. The Lake Shore & Michigan Southern have issued their tariff to correspond to this reduction. Their rates between Pittsburgh and Rochester, N. Y., on bar iron, are reduced from 14 and 11 cents to 12 and 10 cents; between Pittsburgh, and Syracuse, and Utica, 16 and 13 to 14 and 11; Pittsburgh and Albany, 18 and 15 to 16 and 13; Pittsburgh and New York, 18 and 15 to 16 and 13.

The Southern Railway and Steamship Association gives these rates of freight on pig iron from Birmingham, Chattanooga, Sheffield, and Florence to points on and beyond the Ohio River. The rates from Birmingham are: To Cincinnati, $2.75; Louisville, $2.50; St. Louis, $3.25; Chicago, $4; Detroit, $4; Cleveland, $4; Pittsburgh and the Wheeling district, $4.65; Kansas City, Atchison, Leavenworth, and St. Joseph, $5.83. From Chattanooga the figures are: To Cincinnati and Louisville, $2.25; St. Louis, $3; Chicago and Detroit, $3.75; Cleveland, $3.50; Pittsburgh and the Wheeling district, $4.15, and Kansas City and the other points named, $5.83. The rate-sheet, for the first time, gives the figures relating to Sheffield and Florence, Ala., the principal points being as follows: Cincinnati, $2.50; Louisville, $2.25; Memphis, $1.55; St. Louis, $2.80; Chicago and Detroit, $3.75; Pittsburgh and the Wheeling district, $4.40, and Kansas City, Atchison, Leavenworth, and St. Joseph, $5.38.

A Sun Furnace.

One of the most interesting and practical methods of utilizing the heat of the sun is that recently invented by Professor Morse, of Salem, Massachusetts. The arrangement consists of a shallow box, the bottom of which is of corrugated iron; and the top of glass. This is placed outside the building in such a position that the sun directly shines upon it; the heat rays of the sun pass through the glass, and are absorbed by the iron, heating it to a high temperature, and by a system of ventilation a current of air is passed through the apparatus and enters the room, heated to about 90° Fahr.

Industrial Notes

Blast Furnaces:—

Furnace No. 1 of the Stewart Iron Company, Limited, at Sharon, Pa., was blown out Tuesday, the 10th inst., owing to the unsatisfactory condition of the iron market.

The Cartersville Iron Furnace Company, of Cartersville, Ga., have been chartered by John Postell, D. W. R. Peacock, Geo. A. Patillo and others, with a capital of $25,000.

The Eliza Iron Company, of Wellston, Ohio, operating the Eliza furnace under lease, will put the furnace out of blast in the course of two or three months and will retire from business, on account of the depression in the iron trade.

Work on the furnace at Riverside, belonging to the Montgomery Chemical & Furnace Company, Montgomery, Ala., is to be resumed. Over $70,000 has already been expended on this plant. The Louisville & Nashville Railroad Company have offered to buy an interest in this furnace, and the furnace people now have the matter under advisement.

The nail factory of the Wheeling Iron & Nail Company, at Wheeling, W. Va., has been closed down for an indefinite period. The blast furnace of this company was also blown out on the 1st inst., for the purpose of being relined and repaired. It has made an excellent record, having been in blast continuously since November, 1885, on one lining. It will resume operations again about October next.

The *Industrial World* says that one of the most peculiar shipments ever made from Chicago will be 600 tons of pig iron placed with Messrs. Beckwith & Fleming, of this city, for Liverpool, England. The iron in question is a charcoal brand, from Elk Rapids, Mich., and is ordered by a firm who make malleable castings, at Derby, England. The shipment will go by lake and canal to New York, and thence by the Inman Line. The freight with the iron laid down in Liverpool amounts to $4 a ton. This would make the iron cost at least $23@$24, delivered.

Rolling Mills:—

Of the Cleveland Rolling Mill Co.'s works, the Bessemer steel works, new steel works, big and small hammer works, old and new blooming mills, the three rod mills, rail, puddle and bars mills, foundry, blast furnace and the model shop, are all working full-handed.

The Greenville (Pa.) Rolling Mill, owned by P. L. Kimberly & Co., and employing about 400 men, was leased by George Stage, of Greenville, when Mr. Kimberly's other mills were shut down. It was kept running until ten days ago, when it was closed. Repairs are now in progress, and it is thought that arrangements will be made so that the mill may be started about August 1, either by Mr. Stage or by Mr. Kimberly.

An employe of the Etna Iron & Steel Company, at Bridgeport, Conn., has gotten up a device which enable rolls to be dressed in the housing without decreasing the speed of the engine so as to necessitate the closing down of the other departments connected with the power. He uses a "worm" and toothed wheel, applied to the rolls in such a way that the engine may be kept up to its usual speed of 45 revolutions per minute, and all parts of the mill receiving power from it, kept in operation, except the one train of rolls in which the one to be dressed is located.

According to the Kansas City (Mo.) *Commercial*, a large rolling mill will be located in Armourdale in the future, but the names of the capitalists backing it have thus far been withheld from the public. The plant will employ about 250 men, and a large amount of capital will be invested in it. It will be located at the foot of Thirteenth street, and Pony avenue, on the line of the Belt Line road. The ground secured for the plant extends back to the Kaw river. It is rumored that the new company has purchased much of the machinery of the old Rosedale rolling mills. The machinery is very valuable, and has been carefully guarded for five or six years, or ever since the Rosedale rolling mills went into bankruptcy.

Machine Shops:—

A stock company with a capital of $1,000,000 has been organized at Owosso, Mich., to manufacture the Stevens patent car axle oiler. J. W. Begole, of Flint, is president of the corporation, and Arthur Stevens, secretary.

The contract has been let for building the machine shop and foundry for Flynn & Emerich, of Baltimore, Md. The building will be five-story, and 58x125 feet.

Incorporated: The Chicago Electric Motor Company; capital stock, $30,000; to manufacture electric appliances; incorporators, R. H. Garrigne, J. C. Scrogges, J., H. Claswell and H. S. Tiffany.

A Pittsburgh dispatch (July 19) says: Two of Claus Spreckels' representatives are in the city to contract for a large number of engines for the sugar king's refinery in Philadelphia. The magnitude of the job causes considerable rivalry among Pittsburgh manufacturers, who say they can do the work cheaper than it can be done elsewhere. They think they will secure the contract.

The Oil Well Supply Company, Limited, of Oil City, Pa., have just received from the East a large drop hammer, which is believed to be the largest in this country. With this hammer and several of smaller capacity, the company are now prepared to do heavy drop-forged work, and at present are at work on an order from New York parties for drop forgings for a patent car-coupler.

Messrs. Binsse & Hauschild, of East Newark, N. J., have received the award of one-half of the gun lathes for the manufacture of the hoops of the 16-inch steel breech-loading rifle guns, the remainder to be awarded when these are completed. These guns are to form the armament of the men-of-war now building. The six lathes for finishing the tubes are to be 130 feet long each; the three lathes for the jackets are 64 feet long each, and the seven hoop lathes are 40 feet long each. All these tools swing nine feet over the bed and nine feet across the bed.

Messrs. Lodge, Davis & Co., Cincinnati, are displaying in the great Exposition now being held in that city, machinery running, covering a space of 1,600 square feet, and representing a cash value of $15,000. They are exhibiting a full line of engine lathes from 7 to 38-inch swing; a full line of turrett chucking lathes from 13 to 36-inch swing; a full line of shapers from 15 to 32-inch stroke; a full line of our improved drill presses from 20 to 40-inch swing; also a full line of our improved brass-working machinery, also a large line of miscellaneous tools. The general machinery display of this Exposition is far ahead of any exposition that has been held in the country. We learn also, that the above firm are running full on orders, having just secured a large order from Lloyd, Booth & Co., of Youngstown, O., for some very large machine tools, and also an entire machine shop outfit for the Wm. Wood Anson Mower & Reaper Co., of Youngstown, O., who propose moving their entire plant to Chattanooga, Tenn. The Exposition is drawing a large amount of business to Cincinnati, and the outlook for the Summer and Fall is very flattering indeed.

Foundries:—

The San Antonio (Texas) Foundry Company will increase its capital stock.

The York (Nebraska) Foundry & Machine Shops have been granted a charter. The capital stock is $50,000.

Incorporated: The Composition Iron Company, at East St. Louis; capital stock, $500,000; to manufacture casting; incorporators, Gustave Fry, F. H. Ellis, Gustavus Heidel.

Contracts have been signed for the removal of the Favorite Stove Works, of Cincinnati, to Piqua. The town of Piqua has agreed to erect the necessary buildings for the new plant of the company on eight acres of ground donated for the purpose, supply them with natural gas for ten years and bear the expense of 250 carloads of freight from the old works.

Fires In Iron Works:—

The engine house at the Florence iron ore mine, at Florence, Wis., was totally destroyed by fire on the 13th inst. The engine house contained about $75,000 worth of machinery, including five engines and hoisting drums, four boilers, two compressors, two pumps, etc. The building was valued at $1,500. The building and machinery were insured for $14,000, which, it is believed, will cover the loss.

Hardware:—

A. L. Stefanski, of Ironton, O., is making efforts to organize a stock company to build a nail factory at Jacksonville, Florida, to cost $30,000.

The Columbiana Handle Company, Columbiana, O., who bought out the Leetonia Tool Company, the first of the year, have built a new shop, 121 feet long and 40 feet wide, which they are now occupying. The works are situated on the main line of the P. F. W. & C. R. R. They report a good trade, domestic and foreign.

The San Diego (Cal.) Iron & Nail Manufactory, located at Roseville, and the immense buildings to be occupied, are nearing completion. These buildings will cover four acres of ground, and will be very substantial in character. Four hundred thousand feet of lumber was used in their construction, and it took 20 tons of corrugated iron for roofing. When in working order the factory will use 25 tons of iron and turn out 500 kegs of nails daily. One hundred men will be employed. The company has a capital of $250,000.

The Laughlin Nail Company, of Wheeling, W. Va., whose extensive works are located at Martin's Ferry, Ohio, are endeavoring to complete their usual Summer repairs with the view of resuming operations at the earliest moment possible. This company are enjoying an unusually brisk trade this year, and are disposing of their product as fast as it is made. Their factory contains 192 nail machines, and for the past six months their output was over 180,000 kegs, while their shipments for the same period amounted to 190,000 kegs.

Wage Matters:—

The rail mills of the Bethlehem Iron Company started up on Monday last on a scale which provides for a reduction in wages of from 5 to 20 per cent. Continuous work is guaranteed until January.

At the Philadelphia Bridge Works, of Cofrode & Saylor, at Pottstown, Pa., new hours of labor went into effect on Monday, the 9th inst., to continue until further notice. Instead of working from 7 until 12 and 1 to 6, the hours will be from 6 to 12 and to 6 five days of the week, and on Saturday commence at 6 and quit at 11 A. M. for the remainder of the day.

The Bethlehem Iron Company have made a proposition to the men that if they are willing to share with the company a reduction in prices which would be covered by a reduction varying from 5 to 20 per cent. in wages in the different departments, the company on their part hope to be able to provide reasonably steady work during the balance of the year. This applies to the steel mill and old rail mill, but not to the puddle mill. The men have accepted the proposition and the works have resumed operations.

Miscellaneous:—

A certificate has been filed recording the increase of the capital stock of the Chicago Spring Belt Company from $18,000 to $100,000.

A. Baldwin & Co. and their employes will organize a new company to enlarge and operate the present agricultural implement works of A. Baldwin & Co., at New Orleans. They will also erect a seven-story building for warehouse purposes about 100x190 feet, work on which will be commenced about next October.

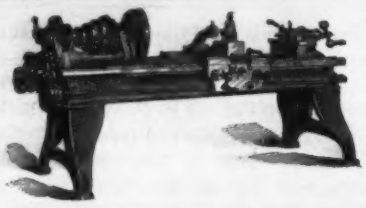
Sealed proposals will be received at the Office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 P. M. on the 31st day of July, 1888, for the labor and materials required in the erection and completion of a hydraulic passenger elevator, complete, run by steam or street water pressure as desired, in the Postoffice, etc., building at Council Bluffs, Ia.

Sealed proposals will be received at the Office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 P. M. on the 4th day of August, 1888, for the labor and materials required in the erection and completion of the low-pressure return-circulation steam heating and ventilating apparatus for the U. S. Court House and Postoffice, building at Nebraska City, Neb.

The first six months of 1888 show an increased volume of trade in chilled and sand rolls over all former seasons. The increase is fully 20 per cent. over the corresponding period of 1887, which was the best in the history of the industry up to that time. While the volume of trade is unprecedented this season, profits were much larger in former years.—[American Manufacturer.

Incorporated: H. A. Hartt & Co., at Chicago; capital, $250,000; to manufacture printing machinery; incorporators, Henry Hartt, J. P. Eldred and Charles Hild. The F. C. Austin Manufacturing Company, of Chicago; capital stock, $150,000; for the manufacture of all kinds of road-building, well-drilling, mill and farm machinery; incorporators, Frederick C. Austin, Elbert H. Cary, and Thomas C. Chapman.

THE first railroad in Persia is being constructed. It will be 25 miles long.



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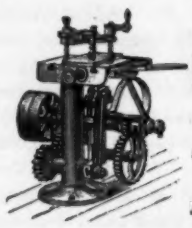

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MADE IN SIX SIZES.
Cutting Keyways and making Keys from 24 inches long down to the smallest work, with accuracy and rapidity.
Send for circulars and description.
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BESSEMER STEEL RAILS,
Blooms and Billets, Steel Angles, Forgings, Bar and Spring Steel, Steel Street Rails, Steel Oil Barrel Hoops, Wire of all kinds, Iron and Steel Boiler Plates, Galvanized and Black Sheet Iron, Corrugated Iron Roofing, Sheet Steel.

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Sales Agents for following brands Lake Superior Charcoal Iron:
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BOILER MAKERS,
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Mines on the Cleveland, Lorain & Wheeling R. R. Capacity, 2,000 tons daily.
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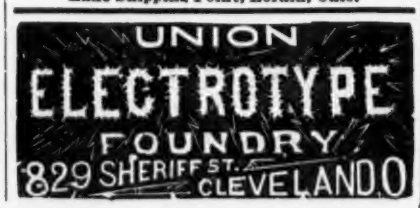

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PARKIN & BOSWORTH, Agents for Shultz Raw Hide Belting, 9 & 11 South Water street.

Carriage Bolts.

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts. 41

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ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 101 St. Clair St. 81

BABCOCK, MORRIS & CO., —COAL.— Grand Arcade Building, Cleveland, O. 5

PICKANDS, MATHER & CO., Iron Ore and Pig Iron, Cor. Bank and Superior Sts. 61

SANGER, A. I., wholesale Scrap Iron, Nos. 173, 175 & 177 Merwin Street. 33

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FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a specialty. Nos. 476 to 432 Broadway. 64

Foundry Facings.

CLEVELAND FACING MILLS, Foundry Facings, Cor. Scranton & Carter Sts. 21

Hardware and Iron.

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water St.

CLEVELAND ROLLING MILL CO., manufacturers of Steel and Iron Wire and Steel Tire. 34

THE EBERHARD MF'G CO. manfrs of Carriage, Wagon and Saddlery Hardware. 25

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MARTIN & BARRISS, dealers in all kinds of Hardwood Lumber. 130 Central Way. 51

Lumber.

WOODS, JENKS & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter street. 4

FISHER, WILSON & CO., Wholesale lumber dealers (pine & hardwood), rough and dressed lumber, timber, lath, shingles, etc. 47 Central Way. 82

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FORD, GEO. A., Machine Shop, Wood and Metal Patterns, and Experimental Machinery and General Jobbing. 15½ Frankfort St.

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FLEHARTY, J. H. & Co., Rubber Stamps, Seals, Stencils. 92 Seneca street. 54

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Niles, O.

REEVES BROS., Manufacturers of Boiler, Tank and Sheet Iron Work, etc. 64

Rochester, N. Y.

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. Graham & Co. 43

GLEASON, WILLIAM, manufr. of Machinists' Tools, Lathes, Planers, and Pat. Gear Dressing Machines. 10 Brown's Rac.

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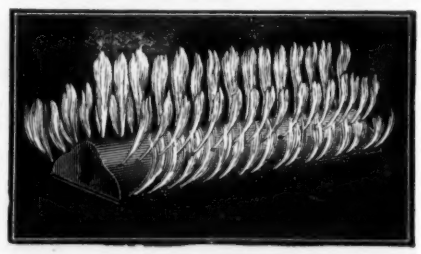


IRON ORE TRANSPORTATION.

THE SANDUSKY SHIP-BUILDING AND TERMINAL PROJECT.

Address of Mr. Matthew Robins, at Sandusky, O., July 14, 1888, in Regard to the "Open Letter" of Mr. R. C. Parsons, Respecting the Great Lakes Transit Company.

The chair was taken by Mr. King, who introduced Mr. Robins.

Mr. Robins said: Mr. Chairman and gentlemen, I am put to-night in a very false position. I am put in that position because a man who represents himself as the mouthpiece of the citizens of Cleveland and of the State of Ohio, has not the courage to come here and boldly sustain the statements he has made in print. It has not been my intention to enter into any controversy with Mr. Parsons, or to appear as the advocate of this scheme. That is not by any means the position which I hold in connection with this enterprise, but as Mr. Parsons had ventured into print to attack it, and had made statements which, on investigation, were shown to be without foundation, it was thought desirable that I should say right here that Mr. Parsons's statements are either deliberately untrue, or else that they betoken an ignorance which would not justify him in appearing before the public at all.

It was also thought desirable that Mr. Parsons should appear here and sustain—if he could sustain—the statements he had made in print, so that before I return to England I might have the opportunity of hearing what he had to say, publicly, in the City of Sandusky, and in the midst of the people who are interested in the enterprise he has attacked, and judge for myself how far the statements he had made could be sustained and how far the citizens of Sandusky could confute them. The moment that proposition was made to me I accepted it. I have traveled many thousands of miles since I last met you, to ascertain the merits of this enterprise. I did not grudge the time or the labor of coming here in order to afford Mr. Parsons the opportunity to say here, publicly, what he had ventured to say behind my back and yours, in print.

I accordingly telegraphed him to this effect:

July 11th, 1888.

To Col. R. C. Parsons, Cleveland, O.:—
I have accepted invitation for meeting at Sandusky, Friday evening, thirteenth, to hear statement respecting your open letter. I invite you to be present. Answer promptly, 45 Broadway, my expense. MATTHEW ROBINS.

To that telegram I received this reply:

CLEVELAND, O., July 11, 1888.

To Matthew Robins, 45 Broadway:
Will be present if possible. R. C. PARSONS.

I consequently came to Sandusky, and on my arrival I had this letter placed in my hands:

UNITED STATES SENATE, CLEVELAND, July 12, 1888.

Matthew Robins, Esq.:
My Dear Sir—Your telegram asking me to be present to-morrow (Friday ev'g) at the Sloane House at Sandusky, came duly to hand, and also your letter of yesterday to same purpose. I replied that I would try to be present. Upon submitting the matter to my clients, they say they can see no object in my going to Sandusky, except to personally oblige yourself. Consequently, I am compelled to express my regrets at not being able to meet you as suggested. Your obedient servant,
R. C. PARSONS.

I received that letter in ample time for Mr. Parsons to take the train from Cleveland this afternoon, if he were so disposed, and in order that he might not lack any inducement, I telegraphed him in these words:

SANDUSKY, July 13, 1888.

To Col. R. C. Parsons, Cleveland O.
Your letter received. It confirms my expectation that you would evade personally sustaining your statements in public meeting.
MATTHEW ROBINS.

Now, gentlemen, that is the reason why I say I am placed in an awkward and invidious position. Although Mr. Parsons does not give me the opportunity of saying so to him, I hope it will be said to him, that if, I had ventured into print, I would have gone to meet the gentlemen whose *bona fides* I had attacked, let the consequences be what they might.

Before I close the remarks which I propose to offer to you to-night, I shall have something to say regarding Mr. Parsons and his relations to this matter, and his manifest motives.

I wish first, however, to say in what way I became acquainted with Mr. Parsons. On the 26th of June Mr. Parsons called on me in New York. He introduced himself as an ex-member of Congress, and claimed to be speaking for the public of Cleveland. He was very much afraid I was being deceived and that English capitalists would lose their money. This was very kind of Mr. Parsons, with regard to English capitalists. He said that his object was to see that I was correctly informed.

He made assertions respecting the railways of Ohio which, on reference to "Poor's Manual," I found to be anything but impartial statements.

For example, regarding the Cleveland, Columbus, Cincinnati & Indianapolis Railway, he said:

"Prior to 1877, it paid regular dividends to its stockholders; since that period it has paid but two dividends to its stockholders, and none since 1883."

On reference to "Poor," I found that for the year 1886, this railway had paid its interest, amounting in round figures to $705,000, and had a surplus on the year of $780,000. I found that in that year the seven per cent. bonds of this railway, maturing in 1899, had sold at 128, which after making allowance for loss of premium on redemption, represented 4¼ per cent. to the investor. That was in 1886, before the conversion of English Consols to 2¾ per cent. occurred, and before the extreme plethora of money enhanced the value of securities the whole world over. Yet this bankrupt road commanded that price for its bonds. He referred to several other lines of railway, and ultimately said he wanted to get rid of these ore contracts. I said undoubtedly he did.

He said he was speaking for the inhabitants of Cleveland. I replied, "I knew the sentiment of the people of Cleveland, and that he did not represent it." That was the way in which Mr. Parsons became introduced to me.

Now, gentlemen, I am not here in the capacity of a partisan or advocate of this scheme. You, who are interested in the development of Sandusky, are perfectly competent to take care of that part of it. You will bear me witness that when I was asked to interest myself in this matter, I laid it down as a fundamental proposition that no money could be had unless the security was made adequate. I have not varied from that proposition. I stand on that ground to-day. I said then, and I say now, that there is any amount of money to be had, if the security is adequate. I do not appear before you as the advocate of this enterprise; it would be inconsistent with my relations to it that I should.

Gentlemen, I was unknown to Mr. Parsons. I was entitled to receive from him the ordinary courtesies due from one man to another. When he came to me volunteering information which it was desirable I should have for the guidance of investors, I had a right to have true information and reliable, and I had also a right to inquire into his motives and the *bona fides* of his representations. If I found, as I did find, that he came to me intending to mislead and to put into my hand untruthful statements, I had the right to resent it as a personal insult to myself. If in the course of my investigations I find that the evidences are not only against his statements, but strongly in support of the schemes which you gentlemen are endeavoring to promote, I am at liberty to make use of that and you are at liberty to take advantage of it.

I would like to read you this open letter. I am not so sure that it has been widely circulated, because I asked Mr. Parsons to favor me with a few copies of it, which I would see were circulated among my friends, and he replied that he had none. I will read extracts from it:

I am informed that an "English Syndicate," composed of highly respectable and wealthy persons, without the aid of American capital, propose to expend the sum of nearly five million pounds sterling in constructing a line of railroad from the city of Sandusky, in the State of Ohio, upon the borders of Lake Erie, to connect with some point across the State with the Ohio river.

I do not know that I have ever stated to Mr. Parsons, or any one else, that there was an English syndicate for this purpose. I have never opened my lips as to the source from which the money was expected to come for this enterprise, and there is no man on this side of the Atlantic that can say he has ever heard me speak of an English syndicate. I think I know men of Mr. Parsons' stamp too well to place in their hands information of that kind.

It is claimed that the capital necessary to carry out the above enterprise has been already subscribed; and that the syndicate furnishing the same, honestly believing in the feasibility and profitable character of the plans, are preparing to sell the stock of the several companies to be organized by the syndicate to innocent subscribers abroad, who are wholly ignorant of the real nature of the investments, and of the character or value of the same.

There has never been a word said about selling the *stock* of this company to any living soul under heaven. The only thing discussed has been the placing of the *bonds* of the company. I quote further from Mr. Parsons's "Open Letter:"

Having no desire to misrepresent the condition of the railroads in Ohio, at present in complete running order, equipped with every facility for doing business, I give a brief synopsis of their history, so far as they connect with the lake shore from the Southern portion of the State.

Now, without following all Mr. Parsons's allusions to the ten lines of railway mentioned in his "Open Letter," which, by the way, are so brief as to omit all the important facts, I will not trouble you with all these details, but, as a specimen of the whole, I will give you one of them. Mr. Parsons says of the Cleveland, Lorain & Wheeling Railway:

This road runs from Cleveland to West Wheeling, 158 miles, to the Ohio River. It was opened in 1873, sold under a foreclosure in 1875, and reorganized. It has paid one dividend upon its capital stock.

Now, gentlemen, I ask you whether the history of railroads in 1873 and 1875 is any criterion by which to judge the merits of American railways in 1888. Are there not numbers of railways paying not only the interest on their bonds, but dividends upon their capital, which 15 or 16 years ago were paying nothing whatever? Have not many of these roads, which were then unprofitable, since become profitable and paying concerns, and are not their securities commanding good market prices to-day? If ancient history is to be the standard by which to estimate the condition of American railways to-day, how is it that roads which then issued their bonds at seven and eight per cent., can to-day issue them at four? Mr. Parsons must know quite well that the fact of a railway having been in an unsatisfactory condition ten or fifteen years ago, is of no value whatever, as evidence either as to the present condition of the railway, or as to the capabilities of the country through which it passes.

In regard to the Cleveland, Lorain & Wheeling Railway, I called Mr. Parsons's attention to this fact, that in the year 1886 the net earnings were 31.61 per cent. of the gross, and amounted to $257,432, and that they had paid the interest on their bonds, $49,000, and dividends on their stock, $213,000. Had Mr. Parsons's object been to reveal the truth, impartially, he would have stated the fact of the payment of this and subsequent dividends.

Now, this, gentlemen, is a fair specimen of the care and research which this gentleman gave to the subject before launching his ill-timed, ill-conceived, immature statement at the head of his imaginary English Syndicate.

Take as another example his reference to the Columbus and Hocking Valley R'y:

Line from Toledo [Lake Erie] to Gallipolis [Ohio River] 257 miles. Made by consolidating several roads in 1881. Owns the great coal fields in the Hocking Valley, and is one of the best equipped roads in the State. Paid one dividend of 2½ per cent.

It is not necessary for me in this place, and before this audience, to discuss that statement at any length. The facts are known. It is notorious that this Company is, and has been, paying interest on $8,000,000, the purchase price of the so-called coal lands, which have never contributed a dollar to the revenues of the Company, and have given no earning power to the Company. When Mr. Parsons wrote the words I have quoted he knew quite well that the directors of the Company are at the present moment endeavoring to void the sale for the reason that the sale of those lands to the Company for $8,000,000 will not stand the test of legal inquiry. It suited Mr. Parsons's purpose to allege that the Company pays no dividends and to withhold the fact that it does pay 5 per cent. per annum on $8,000,000, or one-half its total funded debt, representing no asset of corresponding value, and no earning power. Is it any wonder that the road pays no dividends? This is another illustration of the impartiality (?) of Mr. Parsons's inquiries. Let us hear Mr. Parsons on the steamship fleet:

It is said that the Syndicate will establish a large shipyard and costly shipbuilding plant at Sandusky, and proceed to build a fleet of iron steamships to compete for the ore trade of the Upper Lakes. It is estimated that the "Plant" for this company will cost $1,000,000.

With all respect, I cannot see the need of any such additional vessels upon the Lakes, nor the business to warrant their construction. The present needs of commerce are amply supplied, and it is now dificult for all vessels to obtain employment. Freights are low and profits exceedingly small. Within two years 37 new steamers have been built, at a cost of $7,000,000. The various shipyards are supplied with every facility for building vessels, and have ample capital. At present the larger part of these yards are comparatively idle for the lack of business. If the Syndicate desire to build a fleet of steamers, there is no need of its throwing away a vast sum of money in a shipyard "plant," as the present Lake shipyards can construct the vessels more rapidly and cheaper than any new company can do.

In 1874 freights ruled as high from Marquette, upon Lake Superior, to Lake Erie ports, as $5 per ton; and contracts were made for three years at $3 and $3.50 per ton for same service. Since that time ships and shipyards have multiplied, and the average rate, for the past seven years, of freights has been about one dollar per ton. Last year (1887) was an exception. The opening of the Gogebic mines, and the large demand for iron caused by building new railroads, forced the price of freights to $1.40 from Lake Michigan, and $2 to $2.50 from Lake Superior. The stimulus of that year has so enormously increased the fleet that the facilities are in excess of the demand, and the rates of freight have declined over 100 per cent.

What profit can a syndicate rationally hope to make in a business already crowded, where the present ships are largely owned by the shippers and producers themselves? There is scarcely a mining company doing a profitable business, whose stockholders are not interested in steamships to transport their own cargoes.

I do not say that the English fleet cannot secure its fair share of the business of the Lakes. But I deny that it can count with certainty upon a safe, profitable, continuous business from year to year, in competition with the $80,000,000 of American capital engaged in the same employment. The fluctuations of commerce, the laws of supply and demand, affect all alike. Nor is it probable that a corporation, however prudently managed, with a staff of salaried officers and agents, will manage more economically or wisely than the army

of private owners, whose local knowledge and long experience have trained them to meet intelligently every problem in lake navigation.

It is said that the "Syndicate" proposes to secure uniformity of rates, and certain yearly profits from their ships, by contracting with shippers at specific rates for a term of years. If such contracts with corporations are not illegal, they are wholly impracticable, and if made, are of no value.

I commend that last sentence to such of you as are members of the Bar, as the deliberate utterance of a member of your profession. More unmitigated rubbish was never put into print.

Gentlemen, I have had no time to devote to anything like an exhaustive research in regard to these statements of Mr. Parsons's. But the time that I have been able to give has shown me this: that all the evidences were overwhelmingly against him, and that there has been either an ignorance of the subject which amounts to absolute midnight of the intellect, or, if Mr. Parsons prefers it, a deliberate attempt to mislead. Had he the manliness to be present this evening, I should have had several questions to put to him, which it would please me greatly to hear him answer in your presence.

I would like, however, before I pass from this branch of the subject, to look somewhat more closely at the foregoing quotation from Mr. Parsons's "Open Leter."

Respecting supply and demand for vessel tonnage, I have in my hand a return, compiled from official records, for which I am indebted to the kindness of a gentleman who has occupied a high official position as a statistician of the United States for a number of years. He has given me the statistics for periods of five years, commencing with 1857, down to 1887, showing the number of vessels on the lakes, their tonnage, passengers, coal, flour, grain, iron ore, lumber, copper, etc., carried.

For the period from 1882 to 1887—

The number of vessels increased	.....	96 %
Registered tonnage of vessels increased	.....	98 %
Freight carried	"	170 %
Passengers carried	"	11 %
Coal carried	"	214 %
Flour carried	"	357 %
Grain carried	"	467 %
Iron ore carried	"	153 %
Lumber carried	"	99 %
Copper carried	"	37 %

Reduced to a tonnage basis, the increase of freight from 1882 to 1887 was 185 per cent., against an increase in the tonnage of vessels of 170 per cent., leaving a growth of the traffic of 15 per cent. in excess of the increase of vessel accommodation; and yet Mr. Parsons, in the face of these statistics, issued officially by the Government and open to all the world, with that charming disregard of fact which characterizes all his allegations, asserts: "The present needs of commerce are amply supplied," and "It is difficult for vessels to find employment."

Gentlemen, let us apply the test of another standard. I presume no persons in the United States know the condition of the freight market better than the railway companies who are carrying that freight. If it be true that the tonnage is in excess of the demand, how is it that these great trunk lines of railway are to-day building a considerable number of steamers of large tonnage capacity for the traffic on the lakes? They would not be likely to increase their fleets if there were not employment for them. In addition to this I want to say just here, that I am not speaking from hearsay; I am speaking from actual interviews I have had with leading railway men, and gentlemen connected with the iron industry, and in order to get that information I have traveled thousands of miles, for that and no other object. I know one great railway company now building several large steamers, whose President informed me that it was an absolute necessity in order to keep their freight moving, and to avoid a block. If this statement of Mr. Parsons be true, how is it that the large iron mining companies, several of them, to my certain knowledge, contemplate building large steel steamers—ore carriers—because they were unable to secure adequate tonnage on the lakes? I have conferred with the presidents of some of the largest mining companies you have. Moreover, I have had personally, verbally, and by letter, from gentlemen connected with these mining companies, assurances that this scheme which you, gentlemen, are putting forward, is a scheme which is admirably adapted to meet the requirements of both the miner and the smelter.

On the subject of the new steamers of the last two years, and the capacity of existing shipyards, had Mr. Parsons favored us with his presence to-night, I should have asked him the following questions: First. Is he aware that out of a fleet of 3,128 vessels on the lakes, only 1,232 are steamers, with an average tonnage of 319 tons; and

Second. Does he know that only 43 of these steamers are of iron and their average tonnage is 1,088 tons?

These figures are official, published under the authority of the Federal Government. They show that for the accommodation of a traffic which, according to Mr. Parsons, in another place, when he was advocating the other side of the case, amounts to 20,000,000 of tons annually, and is "richer than the whole foreign trade of the United States with the entire world," there are only 43 modern-built vessels, with an aggregate capacity of 47,000 tons.

Third. I would further ask Mr. Parsons in which of these "comparatively idle" shipyards he could, to-day, place orders for the construction of ten steel steamers of 3,000 tons each, to be ready for the opening of navigation in 1889?

If there is any gentleman here connected with the shipbuilding interest on the lakes, perhaps he can answer that question. I am bound to say that all my inquiries have gone to show that it would be impossible to get reliable contracts placed for such a number of vessels to be ready by that time.

Gentlemen, to my mind, the figures I have quoted from the official returns show—

First. That the demand on the lakes for vessels of modern construction and increased tonnage capacity has set in, and

Second. That small, obsolete vessels are doomed, and that this accounts for Mr. Parsons's anxiety for his clients.

These are strong evidences in favor of this enterprise which you are seeking to establish.

Respecting Mr. Parsons's extraordinary ideas of the freight market I shall have something to say later.

When Mr. Parsons left with me his "Open Letter," I had a conversation with some gentlemen connected with some of the railways he had referred to. I took a short look into "Poor's Manual," and then addressed to Mr. Parsons, a letter. With your permission, I will read the correspondence which ensued:

NEW YORK HOTEL, New York City,
Tuesday, June 26, 1888.

R. C. Parsons, Esq., Cleveland, O.

Dear Sir:—Appreciating the manifest disinterestedness of your voluntary call upon me this morning, in which you were kind enough to hand me a copy of a paper entitled "An Open Letter to the English Syndicate who Propose to Build Railroads and Steamships in Ohio," I have made it my business, in the short time that has elapsed since our interview, in addition to consulting Poor's Manual, to place myself in direct communication with gentlemen officially connected with some of the railways alluded to in your pamphlet. The result has been to show your statements, in many respects, to be so diametrically opposed to actual facts, as to preclude the possibility of the conclusion that the misstatements are the result of inadvertence. Both Poor's Manual and the railway officials contradict them.

I do not propose at this stage to enter upon a controversy with you. You have yourself initiated and invited discussion, by placing in my hands, unsolicited, garbled and incorrect statements. My purpose in writing you, is simply to say that information already obtained by me is sufficient to damn your pamphlet. I propose testing the accuracy of every statement it contains, and if you desire publicity for your publication, it will give me pleasure to afford the public an opportunity of comparing your allegations with the authoritative statements of responsible officials.

I shall, if necessary, communicate with all the railways to whom you have alluded, that they may act as they think desirable.

The carelessness, not to say recklessness, of your allegations, is indicated in page 7, of your pamphlet, in which you make the absurd statement that the rates of freight have declined over 100 per cent. I am not concerned with disagreements on commercial questions between yourself and other citizens of Cleveland, but when you, a total stranger to me, attempt to mislead me by voluntarily placing in my hands, statements which are inconsistent with fact, there is grave reason to question your motives, and I should have supposed your long experience would have taught you that no cause is ultimately benefitted by advocacy of this character.

I am, Sir, your obedient servant,
MATTHEW ROBINS.

To that letter I received the following reply:

CLEVELAND, July 2, 1888.

Matthew Robins, Esq.:

My dear Sir—On my return from New York I found your letter of Tuesday last. I have no desire to write any sharp words in reply, as I am satisfied by this time, a more careful examination of the pamphlet has proved that every statement in it is absolutely correct. If such is the case, probably no one will regret your hasty letter more than yourself. As an instance of my reckless disregard of facts, you call attention to my "absurd" statement that lake freights, since last season, have fallen off "over 100 per cent." Yet this statement is literally and actually true. Last year freights from Ashland were $2.40 and $2.70 on iron ore, per ton. This year the rate has been from $1.10, $1.20 and $1.15. On Saturday the rates by contract from Ashland were $1.15. The rates on iron ore from other lake ports have fallen in the same proportion. This is a decrease of over one-half, or in strictly commercial law language, "over 100 per cent." There is no occasion for any personal display of temper on my part in this business. As I told you, I had no personal interest in the matter, but as the attorney of the vessel owners in Cleveland, I "volunteered" to go to you because I was sent. My clients learned that you were, or were supposed to be, the chief agent of a great scheme to build a railroad from Sandusky into Southern Ohio, and also to build a number of iron ships to carry ore upon the lakes; that the contracts already drawn were to take effect in 1889. As you could not build vessels by that time, my clients desired to sell you a sufficient number of steamers to enable you to carry out your contracts. So far as the pamphlet is concerned, my clients regard the railroad scheme and the steamship company in connection with it, as chimerical, and one almost certain to sink all the money put into it. Your project was made fully public here, and several of my clients were asked to enter into a contract with the steamship company. Certainly they have a perfect right to criticize, approve, or condemn it. But they have no right, nor desire, to misrepresent or misstate any fact, and I believe they have not done so.

As you say you have nothing to do with the steamship company or the purchase of its vessels, nothing more need be said about this branch of the plan. You cannot, then, be offended if I say, that in my belief the Northern Lake Transit Co. is a myth; that it may or may not be hereafter organized under the laws of Illinois; that Mr. Crane, the trustee, is not a gentleman of pecuniary responsibility, and that the so-called company has no substantial backing of any kind; that it is one of those visionary schemes, purely speculative in character, to be floated hereafter, if men in Cleveland can be found who will sign contracts enough to warrant a reasonable business.

As for the railroad from Sandusky, stripped of all connection with the "Lake Co.", we care nothing about it. If anybody, after being honorably informed as to the facts, and the history of similar enterprises in Ohio, chooses to build a road to Coshocton, our people will make no objection. It is none of our business that the money will be thrown away. The responsibility for this must be left with you and your associates.

I am, Sir, your obedient servant,
R. C. PARSONS, Att'y.

Mr. Parsons "volunteered to go because he was sent." [Great laughter.]

Gentlemen, if he had said he volunteered to go because he was paid, I should have regarded it as strictly true.

But I invite your attention to Mr. Parsons's statement respecting freights, which he says have declined "over 100 per cent."

Well, gentlemen, I confess that when a man has his attention called to such an absurd blunder as that, and then enters into an argument to defend it, I am at a loss to determine whether he or those whom he calls his clients—if he has any clients—are the most demented. For I cannot conceive of men having interests of value placing them in the hands of a man who could make and reiterate such a statement.

Colonel Parsons says that the rate from Ashland in 1887 was $2.40 to $2.70. That is an average of $2.55. The rate for 1888 is $1.15, or a reduction of $1.40. According to Colonel Parsons, $1.40 is 100 per cent of $2.55: therefore $1.15 is 82 per cent of $2.55, hence $1.40 plus $1.15, or $2.55, is 182 per cent of $2.55.

Now that is the logical deduction from Mr. Parsons's statement. I do not want to tender advice to Mr. Parsons—an ex-member of Congress of the United States, and the representative of the Vessel Owners' Association of Cleveland—but I would recommend him to sit at the feet of some first-form schoolboy and learn the elementary rules of arithmetic. This is in such 'strictly commercial law language" that it passes my comprehension. My friend, Mr. Sherman, is here and can perhaps tell me to what text-book I can refer for Mr. Parsons's authority.

Surely, gentlemen, that is not the standard of intelligence to which the clear-headed and successful business men of Cleveland entrust their interests. I am not surprised that Mr. Parsons's clients "could" see no object in his going to Sandusky.

In my opinion Mr. Parsons's statement (not his theory but his facts) is a conclusive corroboration of the principles upon which this scheme is based, and which have been sustained by every man in the iron trade whom I have seen. Here you have a reduction of $1.40 per ton in a single year upon stuff of which I suppose the value at the mines is about $2.50 to $3.00.

Now, allow me to say, this was the first complaint I heard from the miners, that not only was the present available tonnage inadequate, but freight rates were so uncertain and fluctuations so violent and so great that the profits which should accrue to the miners were monopolized by the vessel owners, and this was especially the case in 1887. They expressed their willingness to join in this enterprise instead of building vessels for themselves, because they believed that the management of a large company especially devoted to this traffic would be more systematic, economical and reliable than could be secured on a smaller scale, or by a number of individual owners, without concerted and systematic action. In this they differ from Mr. Parsons, but then we have to remember they know of what they speak, and he does not. Let us see what an excess of $1.40 per ton on freight actually represents.

Of course, I am aware, it is impossible to make a comparison of this kind with absolute accuracy, because one has not the exact quantities of ore coming from each port, or the exact freight paid from each port, and, therefore, to that extent, these figures cannot be regarded as absolutely accurate, but Mr. Parsons says that freight from Ashland was reduced by $1.40 per ton between 1887 and 1888, and that freights from other points were reduced in proportion. On the shipments of 1887, which amounted to 4,738,903 tons, this difference would represent $6,634,404, or considerably more than the entire cost of the proposed fleet. If these figures, which are based on Mr. Parsons's own statement, are correct, they absolutely demonstrate the necessity for the Great Lakes Transit Company.

In this connection the record of the Reading Steam Colliers is most valuable. In 1887 these boats carried coal a distance of 966 miles at 91½ cents per ton, at a profit of 40 cents per ton. This rate was the lowest for ten years, and I have purposely selected that year for the sake of comparison to demonstrate how shallow is Mr. Parsons's acquaintance with the subject of which he writes. Yet, in the face of facts such as these, which, like the Government statistics, are available to Mr. Parsons, he has the assurance to say that "freights are low, and profits exceedingly small."

You will observe in Mr. Parsons's "Open Letter," and again in his letter of July 2d to myself, he uses the word "chimerical"—indeed, it occurs in almost all of his productions. You will remember that when Mr. Parsons called on me on June 26th, he professed the greatest anxiety for the safety of English capital. Then he was playing the role of a disinterested philanthropist. On July 2d, however, he, inadvertently, no doubt, admitted that he was the paid attorney of clients

who were prepared to sell to these English capitalists a fleet of vessels to enable them to carry out this very "chimerical" scheme in which their money was to be lost. Did you ever hear anything so entirely absurd and inconsistent?

I would like to ask Mr. Parsons if his clients are as "chimerical" as his ideas? Did he propose to sell the "chimerical" fleet of his "chimerical" clients to a "chimerical" company for a "chimerical" purpose, but not for a "chimerical" consideration?

Gentlemen, Mr. Parsons was quite willing that English or any other capital should be embarked in this losing venture, provided the money went into the pockets of his "clients." This is the measure of Mr. Parsons's concern for the security of British capital.

If Mr. Parsons could succeed in selling his clients' fleet to an English syndicate, did he propose that his clients should retire from the business? Mr. Parsons says:

> Your project was made fully public here, and several of my clients were asked to enter into a contract with the steamship company. Certainly they have a right to criticize, approve or condemn it, but they have no right nor desire to misrepresent or misstate any fact, and I believe they have not done so.

Gentlemen, I know of no one interested in this enterprise who desires to avoid legitimate criticism; with that I have no contention, and I cannot conceive that you can have any objection to it. The defence of the scheme I leave to you.

But the ground of my contention with Mr. Parsons is that he deliberately and intentionally did what he says his clients had no right to do. He came to me, a stranger, with the object of misleading me; he forced his presence upon me for that purpose. I suppose he thought I would be simple enough to receive as Gospel truth, and without inquiry, the assertions of the paid advocate of a rival interest. Had Mr. Parsons contented himself with fair and open opposition to the project, it would not have been my business to enter the lists against him; but when he assumes the character of a spy under the guise of a friend, he incurs the risks of exposure properly due to gentlemen of that ilk. Mr. Parsons's "Open Letter" bore his signature, not that of his clients, and I may be permitted to doubt whether his clients are responsible for it.

He also says: "You cannot be offended if I say, that in my belief the Northern Lakes Transit Company is a myth." Colonel Parsons is the paid attorney and advocate of certain interests to oppose certain other interests, and yet he has not taken the pains to ascertain the name of the concern he is paid to oppose.

In the same letter he says: "Mr. Crane, the trustee, is not a gentleman of pecuniary responsibility, and the so-called company has no substantial backing of any kind."

Now, gentlemen, I hesitate to bring into a discussion of this kind the name of any person. I consider that when a man is driven to that kind of an argument, he has manifested the weakness of his case in a way which he could not so effectually do in any other manner. We are not discussing men; we are discussing a principle. We are not discussing the pecuniary responsibility of Mr. Crane, or of any other individual. I regard it as an outrage of the grossest character to introduce a question of that kind. Mr. Crane has never, so far as my knowledge goes, claimed to be a capitalist. All that he has ever claimed was that absolute justice should be accorded to the business enterprise upon which he had embarked. If I had been asked to obtain a loan upon Mr. Crane's personal security, that would have been a proper subject for discussion; but I was not so asked. The proposition is not to lend money upon Mr. Crane's personal security, but upon the security of the enterprise itself, and it matters not, in such questions, what may be the financial responsibility of the projectors of the scheme. The question we have to deal with is the intrinsic merit of the enterprise itself. To my mind, Mr. Parsons is guilty of an outrage of which he should be ashamed when he introduces a personal matter of this kind into a business discussion. One is tempted to inquire what can be the social or financial standing of a man who is driven to tactics of this sort, and who does not think them unworthy of him. Mr. Parsons invites criticism when he is guilty of such an act as this; but I do not care to criticize him beyond the mention of one fact. The time since Mr. Parsons has been in Congress, has been variously estimated by different persons at from twelve to twenty-five years, and yet he is to-day writing upon the official paper of the United States Senate. One thing I will say for Mr. Crane: I have seen him pay his stationery bills. I do not believe he would have written his letters upon paper in which he had no proprietary interest.

Now, gentlemen, when it comes to a question of Mr. Crane's relations to this enterprise, the point which we are entitled to discuss, is this: Are the theories, which Mr. Crane has put forward as the basis for this enterprise, sound? Fortunately, Mr. Crane is not without a record on that point, such as Colonel Parsons has never yet established for himself. I have here the official reports of the Philadelphia & Reading Railroad Company. These reports show that the fleet of colliers, which Mr. Crane originated for that company, and which have been in constant and successful operation from the year in which they were first started, carried between the years 1873 to 1882 inclusive, 4,696,173 tons of coal, at a net profit of $1,989,290. The average trip of the Reading steamers was 966 miles. The rate of freight in 1873, when these ships began to run, was $2.32 per ton. In 1878 it was 91½ cents per ton. In 1882 it had risen to $1.12. As I have already said, the average net profit during the year 1878 was 40 cents per ton, and the average tonnage of the vessels about 1,200 tons.

Now, I submit these figures of Mr. Crane's Reading scheme, because the principles of that scheme are precisely those upon which he proposes to build the fleet of ore-carriers. If the Reading ships can carry coal at a profit, it is fair to conclude that these will, under similar conditions, carry iron ore at a profit. These are deductions from actual figures, and from an established record. Mr. Parsons's prophecy that the scheme will be unprofitable is the random utterance of a man who neither takes the trouble nor has the knowledge to investigate the subject of which he treats.

Well, gentlemen, when I received Col. Parsons's letter of July 2d, I wrote him again, for some further information. Here is my letter, dated 6th of July:

ALDRICH COURT, 45 Broadway,
New York City, July 6, 1888.

Col. R. C. Parsons, Cleveland, Ohio:

Dear Sir—On my return from Cleveland and the West, I am favored with your letter of the 2d.

I cannot, *as yet*, confirm your prediction that "a more careful examination of the pamphlet has proved that every statement in it is absolutely correct." I am, however, quite open to conviction, and I am as desirous of obtaining, as you can be of furnishing, reliable information bearing on the questions under discussion. I therefore propose to submit to you a series of questions, to which I will ask a categorical reply, and I have no hesitancy in saying that if, on receipt of your reply, and on other examination I should find the statements contained in your pamphlet correct, it will afford me pleasure to promptly withdraw any reflections that I have made on yourself.

Your pamphlet makes certain allegations respecting 10 railway companies operating in the State of Ohio, but, while you allege certain facts, you do not furnish any data in support of them. I therefore beg to ask you in relation to each of the railways mentioned in your pamphlet—

First: The actual amount paid to the company in cash for its stock? I am aware that there are various methods adopted of receiving stock in exchange for contracts, and other colorable considerations, instead of actual cash. I am also aware that in some cases stock has been subscribed and paid for, and an equivalent amount of bonds given with the stock; this, however, is not strictly a cash subscription to the stock itself, and no such transaction meets the point of my inquiries. I want to know what has been actually paid in cash for the stock itself, with no other consideration of any kind whatsoever thrown in.

Second: The actual cost per mile?

Third: The bonded debt per mile, and the respective prices of issue?

Fourth: The amount of bonds issued by any of these railways, the proceeds of which were not received by the Company?

Fifth: I also beg to ask you to favor me with a few copies of your "Open Letter" which it will afford me pleasure to place in the hands of my friends.

Sixth: Is it true, as I am informed, that in February last you appeared before the River and Harbor Committee at Washington as the chosen representative of persons interested in the navigation of the Northern Lakes, to advocate an appropriation for the purpose of improving the Grosse Point Channel?

Seventh: Can you favor me with a copy of your address to that committee, or if not, will you kindly inform me whether the report of your speech, which appeared in the Cleveland Leader about the 25th of February last, is substantially correct?

Eighth: Did you on that occasion represent the "Lake Carriers' Association," or the "Vessel Owners' Association" of Cleveland, or the parties to whom you refer in your letter of the 2nd of July inst., as your clients?

Ninth: Is the capital engaged in the business of the Lakes $80,000,000 as stated on page 7 of your "Open Letter," or $40,000,000 as stated in the "Memorial to the Honorable Senators and Representatives of the Congress of the United States," adopted by the Water Ways Convention, which met at Sault Ste. Marie in July of 1887?

If I am putting you to some trouble you will kindly bear in mind that this inquiry has been initiated by you voluntarily, and you have expressed a strong desire that I should be correctly informed, and that my friends should not be misled, in which desire I heartily concur. By placing in my hands statements of alleged facts you have entitled me to ask for such information as may be necessary to demonstrate these statements.

Awaiting the favor of your reply, I am, dear sir,
Yours respectfully, MATTHEW ROBINS.

Now, I will ask you to hear his reply:

CLEVELAND, July 10, 1888.

Matthew Robins, Esq.

My Dear Sir:—Please accept my thanks for your letter of the 6th, which reached me yesterday afternoon. I am sorry I have not the time to look up the information you desire in regard to the railroads, but as your inquiries range far beyond any public statements published by the roads, I do not know where to look for the facts. Enough for all practical purposes may be found in the "Commercial and Financial Chronicle," published in New York, which you can find in any broker's office, to which you are referred, and "Robinson's Railroad Report of Condition of Railroads in Ohio."

I have no copy left of the "Open Letter." If any remain, they are in the hands of my clients.

I did appear last Winter before the River and Harbor Committee, at Washington, and advocated improving "Grosse Point." The argument was entirely impromptu, and no copy of the address is in existence. I presume the report of the Leader was substantially correct, though I have no recollection of it.

On that occasion I represented the Cleveland Vessel Owners' Association. My present clients are vessel owners, but not any special organization. I believe the value of the capital engaged in the Lakes is $80,000,000, or about that sum. In 1880, when the Census was taken, I think that the estimate was $40,000,000.

The statement, in regard to the dividends of the ten railroads was submitted by me to a careful leading railroad man, and also to a railroad broker, before printing, and pronounced correct.

Your obedient servant,
R. C. PARSONS.

Well, gentlemen, I have been at the pains to obtain and examine "The Commercial and Financial Chronicle," and I should be very glad to spend an hour with Mr. Parsons in comparing his statements with those of the "Chronicle," and if he can adduce from it the confirmation of the allegations he has put in print, I will cheerfully give way to him.

Did you ever, in all your lives, meet a greater humbug than Mr. Parsons proclaims himself by these letters? Here is his absolute admission that he has rushed headlong into print without the slightest information respecting the nature of the enterprise he was attacking, and without having taken the trouble to ascertain the facts on which he relied to sustain his attack, does not even venture to give his authorities, so that one has not the slightest chance of testing the *bona fides* of his informants.

I would like just to give you one or two facts with regard to some of these railways. Take the Cincinnati, Sandusky & Cleveland Railway, about which he says: "Line from Sandusky to Dayton, 154 miles, with leased connection to Cincinnati. The preferred stock has some old bond stock security. No dividends." That is the sort of thing which he regards as conclusive evidence that railways in Ohio are not such things as people should put money into. I believe that you will find that only two days ago five millions of dollars of the five per cent. bonds of this very line were taken by capitalists in New York—at all events, the New York papers reported it.

Then take, for instance, the Cleveland, Columbus, Cincinnati & Indianapolis R'y. Mr. Parsons says that he got his information from the "Commercial and Financial Chronicle," that prior to 1877 they paid regular dividends, but that since that period they have paid but two dividends, and none since 1883. In the "Financial Chronicle" of March, 1888, appears the annual report of that railway, as presentsd to its share-holders, and which says that "no bonds have been sold during the year, but bonds to the amount of $33,000 have been redeemed." The surplus of the year 1887, after paying all interest charges and operating expenses, was $997,987. There was spent for additions to the property in 1885 $177,000, in 1886 $188,000, in 1887 $422,000. Now, gentlemen, I say that any man who honestly wanted to represent the facts with regard to that road would have stated, that while it was true the road had paid no dividends, it had spent these large sums from its net earnings in improving the value of its property. Would you not think that incumbent upon a man intending to fairly inform people? But all that is left out of Mr. Parsons's statement, so anxious is he to suppress every fact concerning Ohio railroads except such as would be of damage to them. Now, I will not bother you by going through this volume, which is one of Mr. Parsons's admitted authorities, but as I traveled from New York last night I went through it carefully, and I defy any honest and intelligent man to deduce from its columns the allegations which Mr. Parsons has put into print.

Mr. Parsons says that the American capital engaged in the lake business is $80,000,000.

I have here the proceedings of the Water-ways Convention, which was held at Sault Ste. Marie, in July, 1887, which convention adopted a memorial to Congress in which they stated "That there are now engaged in commerce on the lakes nearly 1,900 American vessels, representing nearly $40,000,000 capital. I asked Mr. Parsons which statement was correct: his of $80,000,000, or that of the Water-ways Convention of $40,000,000. He replied that he "*believed*" it was $80,000,000, but he gave no authority.

Mr. Parsons further takes up the proposal of the "Syndicate," as he is pleased to term it in his blissful ignorance of the facts, in this language:

> It is said that the Syndicate propose to secure uniformity of rates, and certain yearly profits from their ships, by contracting with shippers at specific rates for a term of years—

And then with that infantile innocence of legal points, which he appears to consider befitting a great advocate, and an ex-member of Congress, he says that these contracts are probably "*illegal, wholly impracticable, and of no value.*"

At my first visit to Cleveland I was asked to meet a number of gentlemen there representing the iron industry, and some of them representing the shipping industry of Cleveland. The very first principle which they laid down was that it was essential to the successful carrying on of their trade that they should have uniformity and permanency of freight rates. They said that the fluctuations of the market were so frequent and violent that it was impossible for them to contract for forward delivery of ore beyond the current season, because they did not know what the freight would be, and that any scheme which would give them a uniform rate of freight for a period of years would be hailed as a boon.

Gentlemen, is it necessary to employ argument to convince intelligent business men that if carriers will contract to carry their stuff for a period of years at a uniform rate, they know at once where they are, and can as well contract to deliver a year or five years hence, as to-day, when they know what the rate is to be?

This is precisely what the mining companies say is the important and governing factor in the successful conduct of their business, want of which has left them so completely at the mercy of the ship-owners, and has forced them to seriously to seek for an adequate remedy, which they say this company will afford them.

It is just this which will ensure to them the uniformity and permanency of freights which they require, which will ensure to the company a return on its capital. We need not refer to persons of Mr. Parsons's capacity for the demonstration of a thing like that. He has ventured out of the realm of elementary law into the realm of elementary arithmetic, and with equal credit.

Now let us for a moment follow Mr. Parsons into the sphere of practical steamship management:

> The computations of cost of vessel service which I have seen made by the friends of the project, omit a very large percentage of expense in loading and unloading, wear and tear of ships, laying up in fall and fitting out in spring, marine . nd fire insurance, and hazards of navigation upon the Great Lakes and rivers, which are well known not to be surpassed in the navigation of any part of the world. During the year 1887, the total losses of vessels in a fleet of 3,400 were 73. There were 175 serious losses, amounting in all in property destroyed to $2,500,000 with 240 lives. Over 1,000 vessels met with more or less injury during the season. During the last eight years there have been 524 vessels totally lost, valued with cargoes at $6,000,000.

I ask any gentlemen here connected with the trade whether the charge made at the port of Cleveland to-day for handling iron ore—loading, discharging, etc., is a paying charge. I am certain I have seen hundreds of thousands of tons of such stuff handled profitably for less money; but I will confine myself to the bald proposition whether the wharfingers of Cleveland derive a profit from the charges made. I fear that Mr. Parsons is out of court again, because the charge for that service, included in Mr. Crane's estimates, is, as I am informed, precisely the same as that current at Cleveland. It only shows, gentlemen, the superficial way in which Mr. Parsons is content to investigate a subject before he launches into print.

Mr. Parsons says that during the year 1887 the total

losses in a fleet of 3,400 were 73. That means that 2¼ per cent. were totally lost during the year 1887. Yet, in the face of that fact—which is contained in Mr. Parsons's own statement—he says that the prospective increase in the fleet by the construction of this company's vessels, representing an addition of one per cent. in the number of vessels, and 1½ in the tonnage capacity, is going to be ruinous to the men who put money into it.

He winds up this unique and interesting production of his (which he has run out of, but which I intend to have reprinted) as follows:

If with the above facts, the foreign stockholders insist upon expending five million pounds sterling in building railroads and steamships in Ohio, our people will cheerfully take their money for labor, lands and material, and make no protest. But from my point of view, the whole scheme is visionary and ill-conceived; one that in no manner should find favor with prudent brokers or thoughtful men anywhere. Its projectors must have had other motives than to secure substantial returns for the capital of confiding stockholders.

I would like to inquire for a moment into the motives of Mr. Parsons in his relations to this subject.

In the course of my investigations I made a very interesting discovery. I find that in February last there was a representation to be made to Congress for the purpose of getting an appropriation for an improvement of the Grosse Point Channel. The advocate of that improvement, and the gentleman who appeared before the River and Harbor Committee, at Washington, was Mr. R. C. Parsons. I have before me a report of his speech, which he has admitted to be substantially correct, in which there are some very striking passages:

No man, however brilliant his imagination, can scarcely grasp the almost limitless wealth of the commerce of these great inland seas. Over this identical spot Congress is asked to improve there passes every year a richer traffic than the whole annual foreign trade of the United States with the entire world. Last year the tonnage passing over these St. Clair Marshes was over 20,000,000 *of tons of freight, and* 100,000 *passengers*. The necessity for deeper water arises mainly from lower water and *the use of larger steamers engaged in trade necessary to carry on business at a profit*.

When Mr. Parsons was before the River and Harbor Committee at Washington he did not say that the number of vessels in 1887 had so increased as to render the traffic unprofitable. He was there as the paid attorney of persons who were interested in getting the water-ways improved, and he was prepared to advocate it as strongly as he knew how.

In February, 1888, Mr. Parsons appears before the River and Harbor Committee as the paid advocate of an improvement which was required, according to his own statement, to provide for the larger vessels which were necessary to do this business at a profit. I believe that that statement was strictly true. I believe that commerce on the lakes to-day has necessitated a larger type of vessel than has been in vogue. Is it not so? Are you not building vessels of 3,000 tons burden to take the places of vessels of 400 and 500 tons? If they are not required to-day, what was the object of the ship-owners of Cleveland in sending Mr. Parsons to appear before the River and Harbor Committee, and why was the improvement of such immediate necessity that he could not wait for the measure to go through the necessary formalities before being heard? In June, 1888, he is the paid attorney of vessel-owners to obstruct and oppose a plan to develop the Lake Marine, before a decision has been reached on the case which he had previously advocated. It is thoroughly disgraceful to a man calling himself an ex-congressman of the United States. Surely, gentlemen, that is not the type of man whom you send to Congress to make your laws and protect your interests.

Before the River and Harbor Committee the following is reported to have occurred·

"Why don't your people insist upon a water-way connection from Lake Ontario to the seaboard, or from Buffalo direct to the ocean?" was then asked; to which Col. Parsons replied:

"We do believe that the time will come when statesmen will be found who will be wise and sagacious enough to provide water communication from the head of Lake Superior to the salt waters of the Atlantic. Some day it will be. I intend," said Col. Parsons, "to make this my special business. Just as soon as I am re-elected to Congress, then I am sure it will be done."

Gentlemen, Mr. Parsons was not then particularly solicitous for the protection of English capitalists. Provided he could be re-elected to Congress he was prepared to devote his energies to what, think you? To nothing less than the "providing of water communication from the head of Lake Superior, to the salt waters of the Atlantic."

That scheme, if consummated, would create competition with the great trunk lines of railway, in which an enormous amount of English capital is invested, and which would be rendered unprofitable just in proportion to the success of Mr. Parsons's scheme. Gentlemen, it strikes me that Mr. Parsons's philanthrophy is the purest humbug.

I am not particularly impressed with Mr. Parsons's success as a prophet. I would venture to call his attention to a matter of history which may possibly be a note of warning to a man of his proclivities. I remember that in 1871 some little stir was created by a very amusing and interesting speech delivered by the Honorable Proctor Knott, respecting what is now the city of Duluth. Mr. Knott ventured to predict that expenditure of money in the neighborhood of Duluth would be an unsound policy. He was as confident in his prediction as Mr. Parsons is in his—only that I think Mr. Knott did speak on that subject his honest conviction, as representing his constituents. I met a gentleman in New York the other day who knows Duluth. He said to me: "Do you know that there was not a single prediction of Proctor Knott's speech but what has been falsified by the history of the city? The people of Duluth say that they are going to invite Proctor Knott there, and will give him a right royal welcome, for he has done more for the advancement of Duluth by that speech of his than could possibly have been done in any other way."

I give this to Mr. Parsons as a warning not to venture into the field of prophecy unless he knows.

I have been in the Duluth region purposely to find what the value of the traffic from that point will probably be to this road, and I am of opinion that the traffic from that region alone would justify the contruction of this fleet and line of railway.

Now, gentlemen, as I have said before, it is not my province to take up the position of advocate in this scheme. It has almost been impossible for me to treat this matter without appearing unintentionally in that capacity. The whole course of my research thus far, has been to demonstrate that there is a foundation—a sound, honest foundation—for this enterprise, and my honest conviction is that if you do not carry this thing through, it will be your own fault. I believe that you are honestly entitled to appeal to capitalists in Europe or elsewhere for the necessary money, and I believe that this country will see that this enterprise is honestly conducted, and that men like Mr. Parsons are not allowed by their immature, ill-conceived and intentionally garbled and distorted assertions to influence its success in any way.

Now, before I pass from Mr. Parsons, I would like to read a letter which I have received on this subject, and which is entirely independent testimony:

Dear Sir:—I understand that it is claimed by several parties professing to represent the interests of the Lake Carriers' Association, that Mr. Crane is entitled to no credit for the introduction of certain principles into the construction of the so-called "Reading Colliers," to which their remarkable financial success as carriers of mineral freight is substantially due; and further that there is a disposition to belittle the importance of the application of these principles on a larger scale, in the particular enterprise in which he is now engaged.

The Reading Colliers will illustrate the successful application of two very important principles, to ignore which in discussing the new enterprise is to confess oneself absolutely ignorant of the very A B C of the transportation problem.

The first of these is the use of water ballast, where time is an important element to be considered in marine freighting; while the second is involved in the well-established economic axioms upon which our entire modern industrial system is founded, that consumption is the basis and measure of production, that the greater the demand the larger the production, and the larger the production the less will be the cost of the unit of measure, whether it be a gallon of refined oil, a yard of cotton cloth, or the transportation of a ton of freight by rail or water.

Mr. Crane very early recognized the fact that what most affected the cost of marine transportation was the expense of maintaining the vessel, her crew, etc.; which expense, went on just the same whether she was loaded or light, travels fast or slow; and that it materially added to the cost of carrying coarse, cheap freight, on which the margin of profit was narrow, to be obliged to wait for return cargoes, or else return in ordinary ballast.

It was here that he saw the great value of the water ballast principle and had the boldness to apply it to the construction of the ships in question. He saw that it was more economical to ballast with water and depart the moment the last pound of freight was discharged, than to waste time on slow return freights. The point was to keep the machine (the ship) constantly at work at her legitimate business of carrying a paying load. Anything, such as mechanical facilities for quick discharge (and necessary hatches and steam hoists), quick loading of ballast, economical steaming, or small cost of current repairs, that contributed to this end, he at once adopted.

Applying the second principle, the experience as a seaman had taught him that if there was plenty of freight, large ships were less expensive to run, and more profitable to their owners than small ones. They cost more to run, but they carried a good deal more than was required to make good the added cost.

I have examined the records of our coast marine with great care, and do not find another instance prior to 1869, when Mr. Crane launched his first collier, that these two principles had ever been combined in one system of construction, or even practically recognized.

Hence, I do not hesitate to aver that to him, and to him alone, should be awarded the credit of building the first fleet of steamers in this country, (and indeed in the world), in the planning and construction of which the principles in question were strictly adhered to and successfully applied; indeed, I regard it as an outrage to attempt to deprive him of this well-deserved honor.

Whatever his detractors may claim, they cannot ignore or dispute the fact that the fourteen steamers built on his plans, and under his direction, for the Reading Company, small as they were compared with those he now proposes to build, netted, for their owners, in ten years, nearly $2,000,000. It may not be uninteresting to know, that in adopting these principles, and acting upon them in 1869, as he did, Mr. Crane only anticipated what we now know to have been the drift of the maritime world since that date.

When the Suez Canal was opened in 1870, the average capacity of the 486 ships which passed through it that year was 896 tons, while the average tonnage of the 3,096 ships using it in 1886 was 1852 tons; in other words, in sixteen years the average ship in the commerce of the world had doubled in capacity.

Comparing this feature of the traffic through the Suez Canal with that of St. Mary's Canal, I find that in 1870 the average tonnage of vessels in the Lake Superior trade was but 375 tons, and that in 1887 this average had risen to 587 tons, an increase of but 56 per cent. Mr. Crane is, therefore, not only following the teaching of a great economic principle, but the example of the first maritime nations in pressing upon the attention of capitalists and those interested in cheap freights, the plan of building large ships for the economical transportation of coarse, cheap goods. If there is plenty of freight and he can get the water to float her, his 4,000-ton ship will carry freight cheaper and quicker, and make more money for her owners, than any smaller one. Of course, the owner of the smaller vessel will protest, as did the Scotch and English hand-spinners when the spinning jenny was introduced in 1760, and so the hand-loom weavers did when the power-loom came in vogue in 1810, but what the great mass needed then, and need now, is cheap cotton cloth, and they got it; now we need cheap coal, cheap iron and cheap food, the million will have them, and the big ship, as I have shown, will contribute more than any single factor to that desirable end.

I repeat what I said just a few moments ago, that Mr. Crane's record with these Reading colliers is one of which any man may be proud. I am confident that Mr. Parsons has never contributed so much to the success and advantage of his country as these colliers have been, and it is precisely the same principle which Mr. Crane carried into successful operation in these colliers which he has set for his guidance in this enterprise.

Now, I want to refer to another matter. I do it because I believe that Mr. Parsons has assumed the responsibility of making a statement in print which I am confident is untrue, and which relates to myself. I received from Mr. Parsons yesterday a copy of the Cleveland *Leader*, in this wrapper. In it there is a reported interview with Col. Parsons relative to this matter, which occupies a column and a half. According to this report, the correspondent of the *Leader* asked Mr. Parsons:

"Was there not a person named Robins, who, with Colonel Crane, met the Cleveland mining shippers, and endorsed the projects?"

"Yes. Mr. Matthew Robins, of No. 45 Broadway, New York, an English gentleman, whose business, I believe, is to find market for American securities abroad."

"Did he not indicate to Cleveland people if they would contract to ship their ores for fifteen years by the proposed new line that the capital would be found to build the ships?"

"That is what I understood."

"In a matter of such magnitude, of course both he and Colonel Crane gave references for their character and responsibility?"

"I believe they gave the best of references, but unfortunately nobody seems to have felt it essential to test their value. Mr. A. H. Moss, president of the Moss National Bank, of Sandusky, a wise and conservative citizen of high influence, told me that Mr. Robins gave him, as a reference for his standing, the house of Brown Brothers & Co., of New York, but that he had never written to make any inquiry. Mr. Robins, I have heard, gave the same reference here to others."

"Is there any difficulty about the reference?"

"There seems to be some mistake or misapprehension about it. Mr. Robins must have been misunderstood, for Brown Brothers & Co. say they do not know Mr. Robins or Colonel Crane, never heard of the railroad scheme nor the steamship scheme, and do not know anybody at home or abroad that has."

"How do you know this?"

"I was sent to New York to make the inquiries. Neither Brown Brothers & Co., Baring Brothers & Co., Drexel, Morgan & Co., nor any other moneyed house I know in New York, every heard of this project."

Gentlemen, that statement is untrue. I have received the greatest courtesy from Messrs. Brown Bros., to whom I was properly accredited by my own bankers and I am certain no responsible person in their office said I was unknown to them.

It happens, however, that a prominent banking house in Wall street had my name brought before them without my knowledge. The gentleman who brought it before them is here to-night, and will, perhaps, tell you that, entirely without my knowledge, a cable message was sent to London inquiring about me, and what the reply was.

At this point Mr. Sherman, of Cleveland, rose and said:

I would state to the gentlemen here that being in New York recently, representing some of the iron mining men in my vicinity, I called upon a prominent banking house, with whom I was very well acquainted, and suggested using their name to telegraph to London, permission to do which was very cheerfully accorded. I told them my object, and in their cipher a telegram was sent to one of the leading London banks, as follows:

Matthew Robins four Queen Victoria street will have large loans for foreign account from our clients to his care to be marketed. Cable our expense your confidential expression of his ability to market same, if all conditions are favorable and character of loan first class.

In the course of a few hours the following reply was received:

Party reliable, energetic; has had good experience in marketing high class securities.

I would say further that this was done entirely without Mr. Robins's knowledge until after I had received the answer just read. I may perhaps go a little further and say concerning the reference to Brown Brothers that I called upon a gentleman at Brown Brothers'—one of the leading members of that firm—and he told me that they had had a letter of introduction from Mr. Robins's bank to them, in which he was properly introduced to them.

It was very satisfactory to me to find that he had letters of introduction to such a firm as Brown Brothers & Company, and also that this great London bank would take the trouble to telegraph to New York that this gentleman was reliable.

Mr. Robins [continuing]: I am very much obliged to my friend, Mr. Sherman.

Now, gentlemen, I have done with Mr. Parsons. I leave this interesting specimen of the weather-cock attorney and advocate to the tender mercies of the gentlemen of Sandusky. You have seen the kind of research which he makes the foundation of his reckless statements; you have seen his knowledge of elementary arithmetic, and of elementary law; you have seen the flippancy with which he undertakes to pronounce upon the possible returns which can be derived from capital invested, without taking the pains to look into the publications which are open to his investigation.

Gentlemen, in the imperfect remarks to which you have so kindly listened, I think I have not only demonstrated Mr. Parsons's capacity and reliability, but his motives, and his inconsistencies. You have also seen with what facility he shirks meeting face to face gentlemen whom he has aspersed. So far as I am concerned, I am willing that he shall give to his pamphlet the widest possible circulation. I believe its publication will materially aid this enterprise.

When I met Mr. Parsons I anticipated that I should hear from him words of wisdom; that I should sit at the feet of this Western Gamaliel and learn much. I scarcely anticipated that the champion advocate of the vessel owners, and an ex-member of Congress, would play the part of a coward and refuse to meet me. In parting from Mr. Parsons I tender him this advice: that in future he should abstain from discussing great enterprises, which are evidently beyond his comprehension.

Gentlemen, in my opinion, the money for these projects can be had, if the programme, which has been formulated with great care, is carried out. The placing of it before capitalists has been confided to my care, and shall command my best efforts. I have already enlisted the interest of strong financial men, and if, as I expect, I am enabled to return to London with the completed scheme, I hope to see a successful consummation of our labors.

You, who are interested in this matter, should see that men like Mr. Parsons are placed in their true position, and not allowed to retard the progress of your city and State by untruthful representations for personal gain.

I thank you for your attention.

A very cordial vote of thanks was accorded to Mr. Robins, and the meeting dispersed.

MARKET REVIEW.

OFFICE OF IRON TRADE REVIEW.
CLEVELAND, O., WEDNESDAY EVENING, July 25, 1888.

Iron Ore.

No material change has taken place in the condition of the market since our last report, and no large sales are reported for the week save a 10,000 lot of specular Bessemers at a private figure. There is still a healthy demand for cheap non-Bessemers in Eastern market, for mixture with native ores, and with the cheapening of carrying facilities by rail and water, the outlook is good for supplanting foreign ore by lake ores. Good judges of the trade say that the time is not far distant when mines will be operated by the owners, as the changing conditions and fluctuations will not warrant the assumption of large risks by lease holders in the way of fixed royalties. Coke continues to be sold at $1, and the demand is on the increase since the resumption of coke by many of the rolling mills.

Pig Iron.

A sale of 10,000 tons of No. 1 foundry which had been the subject of negotiations for some time, was effected last week. The cash price at the furnace is said to have been $15.75, but as three different concerns were in the pool, the difference in freights to the point of delivery, makes the price a little higher. A sale of mill iron is quoted at $13.90 for a 500-ton lot, cash at the furnace. These transactions, while painfully demonstrating the shrinkage in prices, are nevertheless indicative of a healthy business condition, and a restoration of confidence on the part of consumers. Considerable quantities of charcoal pig are changing hands, the makers of malleable iron appearing to be active buyers. Emma Furnace, of the Union Rolling Mill Company, in this city, went out of blast, Sunday, for some necessary alterations, but will go in again next week.

Manufactured Iron.

The mill strike, or what there was left of it, is practically over, and business is quietly jogging along as usual, somewhat to the disappointment of the holders of stocks who, with the advent of the strike, saw their way clear to realize on the advance. As it is, bar iron is selling at $1.65 to $1.70 just as before. The sheet mills are starting up again, but they ask a dollar more than last Spring's prices, and they will get it, too. No. 24 brings $2.70 and No. 27, $3. The mills are overcrowded with orders for standard and special shapes, the bridge-building interests being particularly active buyers. Beams and plates are also called for, for the vessel interests, and the mills have every prospect of a busy, thriving season, the reduction in the profit margin, notwithstanding.

Scrap Iron.

Dealers report a very quiet trade, with little demand in any of its branches. Old American rails are offered in considerable quantities at $20, with but few takers, and car wheels do not seem to find favor with the foundrymen just now. Micellaneous and wrought scrap is very dull, but there is some little demand for extra heavy axles.

Hardware.

If "the times be out of joint," that term applies to the hardware trade which is still booming. Usually, the business drops off after the Fourth of July, but no such falling off has been noticed this year, and the jobbers report an excellent trade in every department. This may be attributed to the late Spring, but the fact remains, and the dealers are head over heels in business.

CINCINNATI PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co.

The disposition to make contracts for long-forward deliveries is decidedly stronger on the part of the buyers than it has been for months. Furnaces, on the other hand, are indisposed, as a rule, to make long contracts at lowest current prices. There has been a heavy inquiry during the week from rolling mills, and forge irons are a trifle firmer. The strike is over, and the Manufacturers' Association has collapsed. On the whole, there is a better feeling in the market. A steady decline in the stocks indicates that the confidence of sellers has some foundation. The rains have greatly improved crop prospects in the Central West. We quote for cash (July 21):

HOT BLAST FOUNDRY.—Ohio and Southern Coke, No. 1, $16 50@$17 00; Ohio and Southern Coke, No. 2, $15 50@$16 00; Ohio and Southern Coke, No. 2½, $14 50@$15 00; Ohio Soft Stonecoal, No. 1, $17 00@$17 50; Ohio Soft Stonecoal No. 2, $15 00@$15 50; Mahoning and Shenango Valley No. 1, $16 50@$17 00. CHARCOAL IRON.—Hanging Rock Charcoal No. 1, $20 50@$22 50; Hanging Rock Charcoal No. 2, $19 00@$21 00; Tennessee and Alabama Charcoal No. 1, $17 00@$18 00; Tennessee and Alabama Charcoal No. 2, $16 00@$17 50. FORGE—Strong Neutral Coke, $13 50@$14 00; Mottled Neutral Coke, $12 50@$13 00; Cold Short Coke, $13 00@$13 50. CAR WHEEL AND MALLEABLE—Southern Car Wheel, $20 00@23 00; Hanging Rock Cold Blast, $22 00@$25 00; Lake Superior Malleable, $21 00@$22 00.

LOUISVILLE PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Geo. H. Hull & Co.

Sales of iron in lots of 300 to 500 tons continue to be made at prices current last week. There is a decided feeling on the part of buyers that bottom has been reached, and though it is not expected that much of an advance will take place, prices will probably advance from 25c. to 50c. a ton, and it is thought a good time to buy. We think it looks more favorable than at any time this year for large sales, and at prices better than those recently current. Current quotations (July 23):

PIG IRON.—Southern Coke, No. 1, Foundry, $16 00@$17 00; Southern Coke, No. 2, Foundry, $15 00@$16 00; Southern Coke, No. 2½, Foundry, $14 50@$15 00; Hanging Rock Coke, No. 1, Foundry, $16 50@$17 00; Hanging Rock Charcoal, No. 1, Foundry, $20 25@$22 25; Southern Charcoal, No. 1, Foundry, $17 25@17 75; Silver Grey, different grades, $13 25@$14 25; Southern Coke, No. 1, Mill Neutral, $12 75@$13 75, Southern Coke, No. 2, Mill, Neutral, $12 25@$13 25; Southern Coke, No. 1, Mill, Cold Short, $12 25@$13 25; Southern Charcoal, No. 1, Mill, $13 25@$14 75; White and Mottled, different grades, $12 00@$12 50; Southern Car Wheel, Standard Brands, $21 50@$24 50; Southern Car Wheel, other brands, $18 50@$20 50; Hanging Rock, Cold Blast, $22 50@$24 50; Hanging Rock, Warm Blast, $18 50@$19 50.

CHICAGO PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co., W. W. Backman, Resident Agent.

Heavy buying of Lake Superior charcoal iron is reported, but beyond this, business has not got out of the ruts of the past few months. It is noticed that fewer irons are pressing in this market, and signs of a more hopeful future seem to be plenty. Buyers, however, see nothing to be alarmed at, and think prices will continue down. There is a little better demand for softeners. We quote for cash, f. o. b. cars, Chicago (July 21):

Coke and Bituminous Coal Foundry:-Ohio Hanging Rock softeners, No 1, $18 00@18 50; Ohio Black Band No. 1, $18 00@18 50; Ohio Jackson county, No. 1, $18 00@18 50; Lake Ore and Cinder No. 1, $17 00@17 50; Southern coke foundry No. 2, $17 00@17 50; Southern coke foundry No. 2½, $16 50@17 00; Southern coke foundry No. 3, $16 00@16 50. Charcoal Foundry:—Lake Superior, $19 50@20 50; Southern, $19 00@20 00; Hanging Rock, $20 50@22 50. Car Wheel and Malleable:—Lake Superior, $19 50@20 50; Standard Southern, $21 00@24 00; Hanging Rock Cold Blast, $24 00@26 00; Hanging Rock Warm Blast, $22 00@24 00.

ST. LOUIS PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co.

Southern coke foundry grades of standard brands are very scarce in this market, and buyers are disposed to take hold rather freely when they can buy ahead without paying higher prices. The weakest feature in the market of late has been the Missouri charcoal irons. They have been selling freely, however, and the supply will probably soon be absorbed. Demand is good throughout the usual range of strong and soft foundry irons and for cheap fillers. We quote for cash, f. o. b., St. Louis (July 21):

Charcoal Foundry—Missouri No. 1, $15 50@16 00; Southern No. 1, $17 00@$18 00; Southern No. 2, $17 00@$17 50. Coal and Coke Irons.—Southern No. 2, $16 00@$16 50; Ohio Softeners, $17 00@21 00. Mill Irons—Missouri, $15 00@15 50; Southern No. 1, $14 50@14 75; Southern No. 2, $13 50@$14 00; Car Wheel & Malleable Irons—Southern, $20 00@25 00; Lake Superior, $21 00@22 00; Connellsville Coke, East St. Louis, $4 35; Connellsville Coke, St. Louis, $4 50.

Wages of German Ironworkers.

Boston Commercial Bulletin.

Valuable official data on the wages paid in Germany are being accumulated through the agency of the association formed under the compulsory insurance laws of that country. For the year 1886 the average yearly incomes in a number of industries in different parts of the empire were as follows: (The mark is 23.8 cents in our money.)

	Marks.
Southern Iron & Steel Association	1,040
Rhenish and Westphalian Iron & Steel Association	953
Iron & Steel Association of Thuringia and Saxony	946
North German Precious & Base Metal Association	893
South " " " "	850
Northeastern Iron & Steel Association	839
Rhenish and Westphalian Machinery & Hardware Association	826
Northwestern Iron & Steel Association	805
Southwestern Iron Association	788

These all rank among the 30 associations in different trades and industries in which more than the normal average rate of wages is paid. Only one—the Silesian Iron & Steel Association—paying annual wages of 567 marks, lies below that rate, which is placed at 600 marks per annum. From this data it would appear that $150 per year is considered the normal income of a German workman, the average among the iron makers fluctuating between the range of $200 and $250.

Possible Speed of Locomotives.

A correspondent of the *Sun*, writing of the claim that a locomotive has traveled three consecutive miles in forty-five, forty-six and forty-seven seconds, says: The occurrence is not an unusual one, but it was down grade, for no locomotive in any country is able to attain that speed on a level track. No locomotive in this or any other country has made an authenticated record of 120 miles in 120 minutes with a train of three to five cars behind it, for the simple reason that the present locomotive, with the present boiler pressure of 140 pounds, is not able to do it.

The average time of the fast trains on the New Jersey Central Railroad, the road your correspondent mentions, is under forty-seven miles an hour for only two hours and ten minutes run. So it is of little importance to run down hill at the rate of 78.25 miles an hour for a short distance and crawl up hill at the rate of twenty-five to thirty miles an hour. Persons reading such information—that locomotives have run a mile in forty-six seconds—are apt to assume that they could do this for an unlimited time, up hill and down dale. Down dale is all right, but it is the going up hill which cuts down the average speed.

Some Enormous Salaries.

Some interesting figures in regard to salaries have been elicited in a suit brought in Brooklyn against a baking-powder company. It was shown that the president of the company draws a salary of $50,000 a year, the vice-president $30,000, and the treasurer $5,000. The president of a varnish company, who was introduced as an expert in regard to salaries, stated that the superintendent of his company received $50,000 a year while the yearly business did not exceed $3,000,000.

Another witness stated that in companies in which he was acquainted, the chief executive officers received from $5,000 to $50,000 a year, while a representative of a kerosene oil company said that he knew one officer of a large corporation who received a salary of $30,000 a year and two others who received $20,000 each.

These figures are enormous and were unknown until the days of trusts and combinations. The explanation is furnished in the testimony of one witness, who said that the business of the company with which he is connected has been increased until the profits had reached 450 per cent. on the original capital stock.—[Boston Commercial Bulletin.

Peculiar Business Methods.

It is a peculiarity of the Indian of Ecuador that he will sell nothing at wholesale nor will he trade anywhere but in the market place, in the place where he and his forefathers have sold "garden-truck" for three centuries.

Although travelers on the highways meet armies of Indians bearing heavy burdens of vegetables and other supplies upon their backs, they can purchase nothing from them, as the natives will not sell his goods until he gets to the place where he is in the habit of selling them.

He will carry them ten miles, and dispose of them for less than he was offered at home. We met one day an old woman trudging along with a heavy basket of pineapples and other fruits, and tried to relieve her of part of her load, offering ten cents for pineapples which could be obtained for a quartillo (two and a half cents) in market. She was polite, but firm, and declined to sell anything until she got to town, althogh there was a weary dusty journey of two leagues ahead of her.-[Wm. E. Curtis, in the American Magazine for July.

IN 1838 there were 800 steamboats, 350 locomotive and 1869 stationary engines in the United States. Pennsylvania had 383 stationary engines, more than any other State. Louisiana was next with 274, and was followed by Massachusetts, New York and Ohio respectively.

WATER has a capacity for heat exdeeding that of any other solid or liquid.

LIST OF PATENTS.

Relating to Iron, Steel, Metal, Machinery, Hardware and Mining Interests.

Reported expressly for this paper by H. T. Fisher (late Ex. U. S. Patent Office), Patent Attorney, 34 Blackstone Building, Cleveland, O.

BEARING DATE JULY 17, 1888.

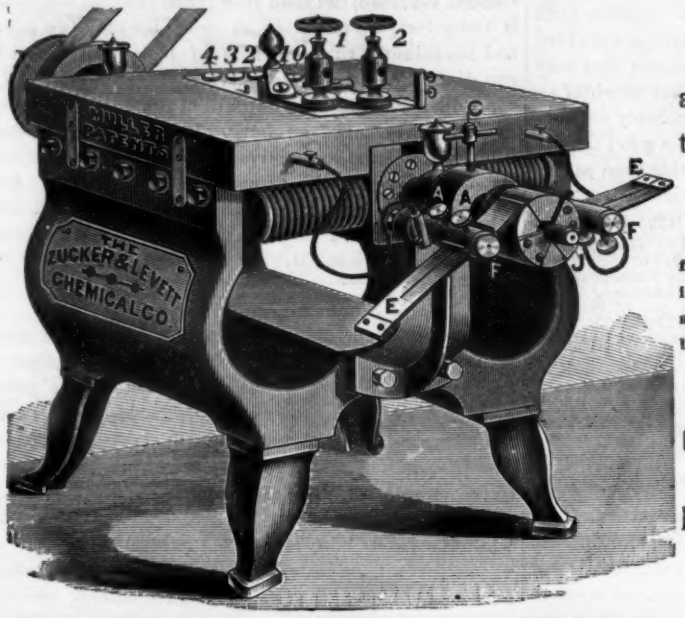
Ammonium chloride, separating, G. Jarmay, Northwich, County of Chester, England.
Casting metallic forms, mold for, J. B. Price, Wellaston Heights, Mass.
Chains, sheet metal, F. Egge, Bridgeport, Conn.
Hose, metallic, J. E. Emerson and T. Midgley, Beaver Falls, Conn.
Nails and spikes, machine for making, J. T. Jones, Iron Mountain, Mich.
Sheet metal, manufacture of, J. Robertson, Brooklyn, N. Y.
Welding, apparatus for electric, E. Thompson, Boston, Mass.
Wheels, manufacturing metal, J. R. Little, Quincy, Ill.
Wire-mat, F. Hainsworth, Chicago, Ill.
Wire winding and unwinding machine, J. W. Roger and R. J. Matheson, Berlin, Iowa.

$60 | AMERICAN GIANT DYNAMO. | $60

Electro-Plating and Electrotyping Machines

IN ALL SIZES.

FROM $60 UPWARDS.



Cheapest and Best in the Market.

Headquarters for everything in the Plating and Polishing line.

NICKEL PLATING AND Polishing Materials.

ZUCKER & LEVETT CHEMICAL CO.,

ESTABLISHED 1863, INCORPORATED 1881.

SOLE MANUFACTURERS & PATENTEES,

Works: 538 to 564 W. Sixteenth St. Office: 36 to 40 Eleventh Ave., New York, U.S.A.

Cleveland Foundry

Castings

For Machinery and Rolling Mills

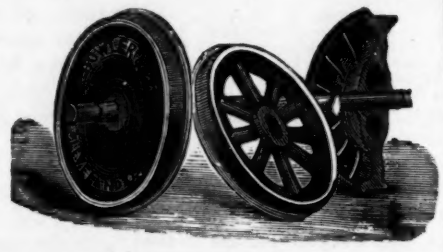
Car Wheels

all sizes and kinds, with and without Axles.

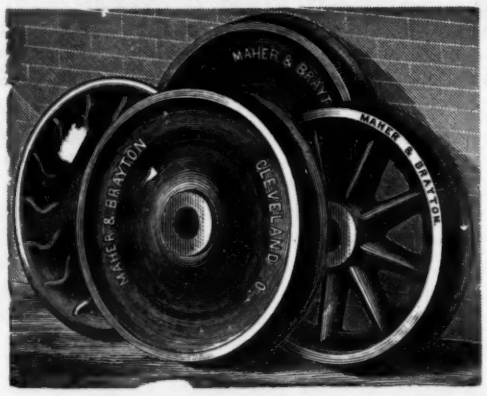
Chilled Faced R. R. Frogs

STREET RAILROAD TURNOUT.

Nos 9, 11 & 13 Winter Street. } Bowler & Co



CLEVELAND WHEEL & FOUNDRY WORKS.



MAHER & BRAYTON, Proprietors,

Manufacturers of

Car, Engine, Truck and Tender Wheels.

RAILROAD, ROLLING MILL and Machinery Castings.

and Street Railroad Wheels and Turnouts.

ALSO

Chilled-Faced Railroad Frogs.

Office: 20 Carter Street,

Works: Cor. Carter and Collins Streets.

Cleveland, Ohio. 32

EMERY WHEEL

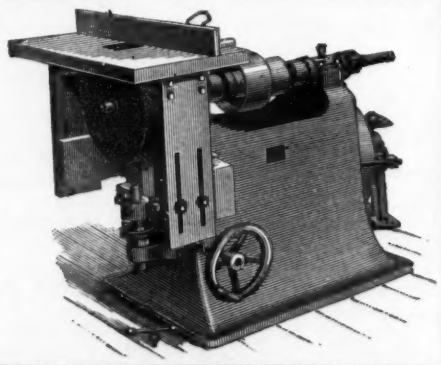
Surfacing Machine.

Base of machine has sufficient flare to give solid floor foundation.

Table is so supported that it cannot spring under heavy weights. Solid emery wheels or wood covered wheels can be used and table is easily adjusted to wearing away of wheel. Machine is well proportioned and thoroughly built. Write for circular.

Springfield Glue & Emery Wheel Co.

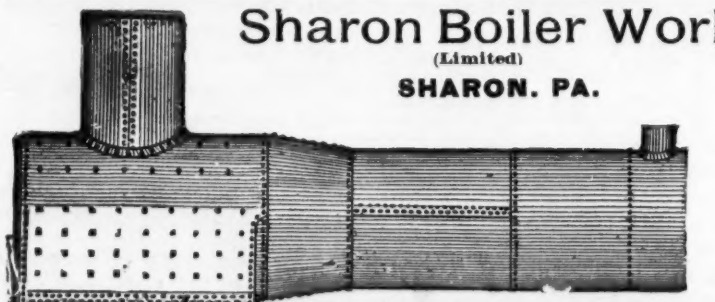
SPRINGFIELD, MASS.



Sharon Boiler Works,

(Limited)

SHARON, PA.



All kinds of Boilers and Sheet Iron work.

Iron Clad Paint Co.

Factory 75 & 77 Central Way. Sec & Treas. No. 3 Case Building.

CLEVELAND, OHIO.

Trade Mark Patented—Paint Protects

Order direct from the Iron Clad Paint Co.,

And get the genuine article, and save liability or suit for using an article made in violation of the patents issued to Wm. Green and now owned by this Company.

IRON CLAD PAINT is the most durable, most fireproof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil.

Used by Nearly all the Railroads. 63

STAR OIL BURNER

EXCELS ALL OTHERS.

Economy in the use of Oil as a fuel. No Clogging, Leaking or Dripping. No Smoke, Ashes or Labor. Cheaper than Coal. Protection to Boilers. Specially adapted to Boiler Furnaces, Brick and Lime Kilns, Glass Melting and Distilleries, and any place where coal is used.

Send for Circular.

THE STAR OIL BURNER CO.,

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O'DONNELL & BARRETT,

BUILDERS OF

Hydraulic and Steam Passenger and Freight

ELEVATORS.

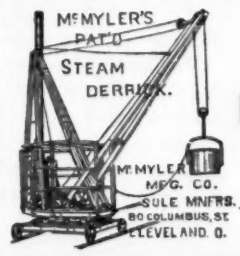
Also Hand Elevators and Dumb Waiters.

No. 53 Center Street,

Telephone No. 2111. CLEVELAND, O.

All Kinds of Elevators Repaired.

McMYLER MANUFACTURING CO.,



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SOLE MANUFACTURERS OF THE

McMYLER PATENT

Revolving Steam Derrick,

AND THE

SEATON RIVET and BOLT HEADER.

Also General Hoisting and Conveying Machinery, Coal and Ore Buckets and Dump Cars.

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HERCULES POWDER

HERCULES, THE GREAT STUMP AND ROCK ANNIHILATOR.

SEND FOR DESCRIPTIVE PAMPHLET

Stump before a blast. | Fragments after a blast.

STRONGEST and SAFEST EXPLOSIVE Known to the Arts.

POWDER, FUSE, CAPS, Electric Mining Goods,

AND ALL TOOLS FOR STUMP BLASTING,

FOR SALE BY THE

HERCULES POWDER COMPANY,

40 Prospect street, Cleveland, Ohio.

J. W. WILLARD, Manager.

CLEVELAND WHOLESALE PRICES.

HARDWARE.

Anvils.

	per lb.
American	10cts dis 20@20&5
Wrights	10c

Anvil Vise and Drill.

Millers Falls Co. $18	dis 20
Cheney Anvil and Vise	dis 25

Augers and Bits.

Common augers and bits	dis 60&10
Snells	dis 60&5
Cook's Douglass Mfg. Co	dis 55
Russell Jennings' augers and bits	dis 25
Expansive Bits, Clark's small. $18; large, $26	25
Hollow Augers, Ives'	dis 25&10
Hollow Augers, Bonney's Adjust. ₱ doz. $48	dis 40&10
Hollow Augers, Stearns' Adjust. ₱ doz., $48	dis 20&10
Gimlet bits	per gross $4 50
Standard Bit Stock Drills	dis 50&10&10
Ship Augers	dis 15@15&10

Awl Hafts.

Sewing, brass ferrule,	₱ gross $3.50, dis 45
Patent sewing, short	₱ doz $1.00, dis 40&10
Patent sewing, long	$1.20 ₱ doz net
Patent peg, plain top,	$10.00 ₱ gro., dis 45
Pat. peg, leather top,	$12.00 ₱ gro., dis 45

Awls, Brad Sets, &c.

Awls, Sewing, Common	₱ gross $1.75—dis 45
Awls, Shouldered Peg ₱ gross	$3.00—dis 45
Awls, Patent Peg	₱ gross 75c—dis 45
Awls, Shouldered Brad	$3.00—dis 10
Awls handled brad	$7.80—dis 30
Awls handled. scratch	$7.50 ₱ gro dis 35&10
Awls, socket scratch	$1.50 ₱ doz dis 25
Brad Sets. No. 42, $10.50; No. 45. $12.50	dis 60
Brad Sets, Stanley's Excelsior, No, 1. $7.50	dis 30

Axes.

Makers' and Special Brands—	
First quality	₱ doz. $7 00
Others	₱ doz. $5 75@$6
Full polished	$8 00

Axle Grease.

Frazier's. in bulk	keg ₱ lb 4c; pail 5c net
Frazier's, per gross	$9.50

Bag Holders.

Sprengle's pat., ₱ doz $18	dis 60

Balances.

Spring balances	dis 45
Common 24 lb	₱ doz $1.50 dis 50

Bells.

Hand. light Brass	dis 70
Hand. White Metal	dis 60
Hand, Silver Chime	dis 25&10&5
Hand, Globe (Cope's Patent).	dis 25&10@35
Gong, Abbe's	dis 25&10
Gong. Nichols	dis 40
Gong, Barton's	dis 40&10
Cow, western	Sargent's List 70
Call	dis 33⅓
Farm bells	dis 70
Steel alloy, church and school	dis 40

Bellows.

	Discount.
Blacksmith's { Hill's	40
Blacksmith's { Bullock's	50&10
Moulders,	discount 40
Hand,	discount 40

Belting, Rubber.

Boston Belting Co.'s standard	dis 60&10
" " " extra	dis 50&10
" " " best	dis 45
Cleveland Rubber Co., extra standard	dis 60&10
Shultz Raw Hide Leather Belting, single,	dis 30
" " " " double,	dis 35
Standard, oak tanned	dis 50
Alexander Brothers' Pure Oak Tanned— New list Oct. 1st, 1887, less	35

Bench Stops.

Hotchkiss's ₱ doz $5.00	dis 10
Weston's ₱ doz No. 1, $10.00; No. 2, $9	dis 25&10&5
Morrill's	₱ doz $7.50 dis 25

Bit Holders.

Extension, Barber's	₱ doz $15 00, dis 25
Diagonal	₱ doz $24.00 dis 40
Angular	₱ doz $24 00, dis 40

Blind Staples.

Barbed ¼ inch and larger	₱ lb 8@8½c net
Barbed ⅝ inch	₱ lb 9@9½c net

Bolts.

Cast iron barrel bolts	70
Cast Iron shutter bolts, etc	70
Cast iron chain bolts	65
Ives patent door bolts	55
Wr't iron barrel bolts	70
Wrought iron square bolts	70
Wrought shutter bolts	60
Carriage com. new list	Sargent's list 75&5
Tire, common, new list	65&10
Carriage and tire, Philadelphia pattern	75&10
Stove bolts	60
Plow bolts	50
Machine	70
Ends	dis 70

Blind Fasteners.

Van Sand's Screw Pattern $15 ₱ gross	dis 60&10
Van Sand's Old Pattern	$15 ₱ gross—dis 50&10
Automatic for wood	$10.50
" " brick	$13.50 } 20

Borax.

₱ lb	9c

Boring Machines.

	Without augers.	Upright	Angular
Snell's. Rice's patent	5 50	6 75	dis 40&10
Lawrence	5 50	6 75	dis 45@45&10
Other machines	2 35	2 75	net
Phillips, with augers	6 00	7 00,	25

Braces.

Barber's	discount 50
Spoffard's Patent	discount 50@50&10
Bartholomew's Nos. 25, 27, 30	dis 50&10
Bartholomew's Nos. 117. 118, 119	dis 70
Amidon's corner brace	dis 40@40&10
Pecks	dis 60

Brackets.

Shelf, plain, Sargent's list	55&10
Fancy " "	dis 60&10
Reading, plain	dis 55&10
Reading, rosette	dis 60&10

Bright Wire Goods.

Regular List	75&10@80&10

Broilers.—Henis' self basting.

Inch	9	10	9x11
Per doz	$4 50	5 50	6 50

Buckets, Galvanized.

Iron clad 10 qt $2 75; 12 qt $3 00; 14 qt $3 75

Bull Rings.

Humason, Beckley & Co.'s	dis 70&10
Peck, Stow & W. Co.'s	dis 50&10
Ellrich Hardware Co., white metal low list	dis 50 @50&10

Butts.

	Discount
Wrought brass	70&10
Cast brass, loose joint	33⅓&10to33⅓&10&10
Cast Iron—	
Fast joint, narrow	50&10&5
Fast joint, broad	55&10&5
Loose joint	66⅔&10
Loose joint, jap	66⅔&10
Loose joint, jap. with acorns	66⅔&10
Loose pin, acorns	66⅔&10
Loose pin. japanned acorns	66⅔&10
Loose pin.acorns,japanned, plated tips	66⅔&10
Wrought steel—	
Wrought. fast joint narrow.	65&10
Wrought. fast joint broad	65&10
Wro't loose joint broad	65&10
Table Butts. back flaps, etc.	65&10 @ 70
Regular inside blind	65&10
Light inside blind	65&10
Loose pin	65&10
Light loose pin	65&10

Can Openers.

Sprague No. 1 $2.00. 2 $2.25. 3 $2.50,	dis 50&10
Star	$4 00 net
Domestic	₱ doz $2 50, dis 45
National	$1 25, dis 45

Caps—Percussion, ₱ 1000.

Hicks & Goldmark's	dis. 25
F. L. Waterproof, 1-10's	50c
E. B. Trimmed Edge, 1-10's	65c
E. B. Ground Edge, Cent, Fire, 1-10's	70c
Double Waterproof, 1-10's	1.40
Musket Waterproof, 1-10's	54c
G. D.	30
Elys waterproof central fire	$1.60
Elys E. B	56c

Cartridges.

Rim fire	discount 50&5
Pistol and rifle	discount 25&5
Military and sporting	discount 15&5

Carpet Stretchers.

Cast steel, polished	₱ doz $3.25
Cast iron, steel points	per doz80c
Socket	₱ doz $1 75
Bullard's	dis25

Cattle Leaders.

Humason, Beckley & Co.'s	dis 70
Sargent's	dis 66⅔&10
Peck, Stow & W. Co	dis 50&10

Carpet Sweepers.

Queen	₱ doz $16.00
Mystic	₱ doz $16
Cottage	₱ doz $15
Queen, with band	₱ doz $18
King	₱ doz $30
Garland	₱ doz $18

Cards.

Horse and Curry	dis 10

Casters.

Bed	dis 50&10@60&5
Plate	
Shallow Socket	
Deep Socket	dis 40&10
Yale Casters. list May, 1884.	dis 30 &10@40
Martin's patent	dis 45&10

Chains.

Trace. 6½-10-2	₱ pair 1.03
Trace, 6½-10-3	₱ pair 92c dis 50&5@50&10
Trace. 7-10-2	₱ pair 1.11
German Halter Chain, list June, 1884	dis 55
German Coil. list of June, 1881	dis 55
Galvanized Pump Chain	₱ lb 6¼
Jack Chain, Iron	70&10
Jack Chain. Brass	dis70&10

Chalk.

White	₱ gross 55c
White Crayon	₱ gross 12@12½
Red	75c
Blue	85c

Chisels.

Socket Framing. and Firmer	dis 75@ 75& 5
Socket Framing and Firmer. Buck, Bros	dis 25
Socket Firmer & Framing. L. & I. J. White	dis 30@30 & 5
Tanged Firmers	dis 40

Clamps.

Snow's adjustable, iron	dis 40
Hammer's adjustable, iron	dis 15
Sargent's cabinet, iron	dis 66⅔&10

Clips.

Axle and spring bar, Norway iron	dis 55&5&5
Wrought-Iron felloe clips	₱ lb. 5½c
Steel felloe clips	₱ lb6c

Cockeyes.

discount	50

Cocks, Brass.

Hardware list	dis40

Coffee Mills.

Enterprise	20 & 10@30

Compasses, Dividers, &c.

Compasses	dis 70@70&10
Calipers	dis 70@70&10
Dividers	dis 70@70&10
Bemis & Call Co.'s Dividers	dis 50&10
Bemis & Call Co.'s Compasses & Calipers	dis 45&5
Bemis & Call Co.'s Wing & Inside or Outside	dis 45&5
Bemis & Call Co.'s Double	dis 50&10
Bemis & Call Co.'s (Call's Patent Inside)	dis 25&5
Excelsior	dis 50
Cook's Extension	dis25
J. Stevens & Co.'s Calipers and Dividers	dis 25&5

Coopers' Tools.

Bradley's	discount 20
Barton's	discount 20
L. & I. J. White	20 & 5

Corkscrews.

Humason, Beckley Mfg. Co	dis 40
Clough's patent	dis 33⅓

Corn Knives.

Clipper	2,00
X. L. C. R.	4.50
Russetts	6.50

Cradles.

Grain	dis 40&10@50

Crowbars.

Cast steel	₱ lb 4
Iron, steel points	3½

Curry Combs.

Fitch's Pattern	dis 40
Rubber	₱ doz. $10.00, dis 25

Cutlery.

Table	net
Excelsior Pocket	net

Dog Collars.

Embossed gilt	dis 30&10
Leather	dis 40

Door Springs.

Torrey's Rod, regular size	₱ doz $1.30
Gem (Coil); list April 19, 1886,	dis 10

Drawing Knives.

Douglass & Middletown	dis75@75&10
L. & I. J. White	dis 20 & 5
Adjustable handle	dis 20

Drills and Drill Stocks.

Blacksmiths' each	2.00
Blacksmiths' self-feeding, each	$7.50 discount 20
Breast, P. S. & W	discount 40 & 10
Breast, Millers Falls	each, $3.00 dis25
Ratchet, Weston's	20@25
Automatic Boring Tools	each, $1.85
Twist drills	50&10
Morse	50&10
Syracuse	50&10
Standard	50&10
Cleveland	50&10

Drill Chucks.

Morse's Beach Patent	each, $8.00, discount 15
Standard	dis. 25

Dripping Pans.

Sheet Iron	large sizes 7c
Shheet Iron	small sizes 6½c

Egg Beaters.

Dover	per doz. $2.00
Standard	per gross $12.00

Emery.

	No. 4 to 46 gr.	No. 54 to 150. gr.	Flour.CF F. FF.
Kegs, ₱ lb	4 c	4¼c	2¾c
½ kegs, ₱ lb	4¼c	4¾c	3 c
¼ kegs, ₱ lb	4½c	5 c	3½c
10 lb cans, 10 in case	6 c	6 c	5 c
10lb cans, less than 10	10 c	10 c	7½c

Escutch a Pins.

Iron, List Nov. 11, 1885	dis 50&10@50&10&5
Brass	65@65&5

Escutcheons.

Door Lock	Same discounts as Door Locks
Brass Thread	dis 60
Wood	dis 25

Files.

Rothery	40
Nicholson	50&15
Black Diamond	60&10
Royal	75
Heller's horse shoe rasp	dis 50&10

Faucets.

Frary's Patent Petroleum	dis 40 &5
First Quality, Cork Lined	40&10
Self-measuring, Enterprise, per doz $36	dis 20&10

Fly Traps.

Paragon	₱ doz $1.75

Forks

Hay, Manure and Spading. list	dis 65&5

Fruit and Jelly Presses.

Enterprise Mfg. Co.	dis 20&10

Fry Pans

Central Stamping Co.'s list	dis 70

No	0	1	2	3	4	5	6	7	8
₱ doz.	$3 00	3 75	4 25	4 75	5 25	6 00	7 00	8 00	9 00

Fluting Scissors.

Discount	45

Fluting Machines

Eagle 3½-inch	$2.15, dis 35
Geneva Hand Fluter. White Metal. ₱ doz. 12.00	dis 25
Shepard hand. Nos. 85 $15.30. 95 $8. 110 $11	dis 40
Knox. 4¼ inch rolls	$3 25 each dis 35
Knox. 6 inch rolls	$3 60 each
Crown. 4½ in. $3 50: 6-in. $4 00; 8-in. $6 50 each	dis 35
Crown Jewel	6-in. $3 50 each, dis 35
American. 5-in. $3; 6-in. $3 40; 7-in. $4 50 each	dis 35
Crown hand fluter, Nos. 1 $15; 2, $12 50; 3, $10 ₱ doz	dis 30

Gauges.

Marking	dis 60&10
Wire	dis 10&10

Gimlets.

Nail and Spike	dis 50&10
Double Cut, low list	25
"Bee"	₱ gross $12, dis 25

Glue Pots.

Tin enamele d	dis 40@
Family, Handy	dis 45

Grindstone Fixtures.

Sargent's	dis70

Gun Wads.

U. M. C. & W. R. A.—B. E., 11up	2 00
U. M. C. & W. R. A —B. E., 9&10	2 30
U. M. C. & W. R. A.—B. E., 7&8	2 60 dis 20&2
U. M. C. & W. R. A.—P. E., 11up	3 10
U. M. C. & W. R. A.—P. E., 9&10	4 00
U. M. C. & W. R. A.—P. E., 7&8	4 90
Eley's B. E., 11 up	2 00
Eley's P. E., 11@20	2 80

Hack Saws.

Griffin's Hack Saws, complete	dis 40
Griffin's Hack Saw, Blades only	dis 40
Diamond Hack Saws and Blades	dis 25

Halters.

Jute horse and cattle ties	$13.50 gro. net.

Hammers.

Maydole &	discount 25@25&10
Atha new list, Jan 15, 1887	dis 40&10@50
Magnetic Tack, No. 1, 2, 3, $1.25, $1.50 and $1.75,	dis 30
Heavy hammers and sledges under 5 lbs, 36c, over 5lbs, 30 c	dis 70

Hand Cuffs and Leg Irons.

Providence Tool Co., hand cuffs, $15 ₱ doz	dis 10
Providence Tool Co., leg irons $25 ₱ doz	dis 10
Tower's	dis 15

Handles—

Door or Thumb Latches.

Per doz Nos.	0	1	2	3	4	
Sargent's	90	1 00	1 18	1 35	1 50	dis 60&10
Roggin's Latches						₱ doz. 30@35c
Bronze Iron Drop Latches						₱ doz. 70c net
Jap'd store door handles—Nuts, $1 62; Plate $1 10; no plate $0 88						net
Barn door						₱ doz $1 80, dis 25
Wrought chest						dis 50&10&10
Surface chest						dis 70
Flush chest						dis 70
Lifting						dis 70
Saw and plane						dis40&10
Hammer and hatchet						dis 25&5&2
Brad awl						₱ gross $2
Hickory firmer chisel, assort						₱ gross $4 50
Hickory firmer chisel, large						₱ gross $5 00
Apple firmer chisel, assorted						₱ gros $5 00
Apple firmer chisel, large						₱ gross $6 00
Socket firmer chisel, assorted						₱ gross $3 00
Socket framing chisel, assort						₱ gross $5 00
File, assorted						₱ gross $2 75
Auger, assorted						₱ gross $5 00
Auger, large						₱ gross $7 00

dis 40 ; 25

Hangers.

Barn Door. old patterns	dis 60&10 &10
Climax (Anti-Friction)	dis 55
Star	dis 40
Scranton	dis 25
Kidder's	dis 50&10
Terry's Patent. 5 in., 12.00; 3½ in., 10.00, dis 50 @	
Paragon	dis 40
Richards	dis 20&10&10

Harness Snaps

German, new list	dis 40&10
Covert, New Patent, new list	dis 50&5&2

Hay Knives.

Lightning	per doz. $18 dis 25
Electric	₱ doz $17.00 dis 30

Hinges.

Wrought Strap and T Hinges	65&10&2@70&10
Screw, hook and strap, 8 10 12 in	3¾@4
to 36 in	2¾ @3
Screw hook & eye hinges, ½ ₱ doz 1.50	
⅝ 2.45	dis 10
¾ 3.80	
Gate, western	₱ doz $4 40, dis 55
Gate, N. E.	₱ doz $7 00, dis 55
Gate. N. E. reversible	₱ doz $5 20, dis 55&15
Gate. Clark's. Nos. 1. 2. 3	dis60&10@60&10&0
Gate. N. Y. State	₱ doz $5 00, dis 55&15
Gate, automatic	₱ doz $12 50, dis 50
Gate, common sense	₱ doz pair $4 50, dis 50
Gate, Shepard's	dis 60&1

Hollow-Ware.

Stove Hollow-Ware. Ground dis	60&10&10
" " Underground	70&10
Enameled Kettles.	dis 70
Saucepans	dis 40

Galvanized Tea-Kettles

Inch	6	7	8	9
Each	55	60	65	75

Hoes.

Garden, mortar	dis 65&5
Planter's, cot	dis 65&5
Canton	dis 65&5

Hog Rings and Ringers.

Hill's rings	$2 50
" ringers. { Old Style	$2 50
" ringers. { Improved	$3 60
Blair hog ringers	₱ doz $2.50

Hooks.

Bird Cage, Sargent's list	dis 60&10&10
Belt	dis 75&10
Clothes Line Sargent's list	dis 60&10
Ceiling Sargent's list	dis 55&10
Coat and Hat. Sargent's list	dis 55&10
Wire Coat and Hat. Gem	dis 45
Wrought Staples and Hooks & Staples, list Jan 12. 1887	dis80&20
Wire Screw Hooks and Screw Eyes.	dis 75&10
Hooks and Eyes—Malleable Iron	dis 70
Hooks and Eyes—Brass	dis 60&10&10

Horse Nails.

No.	10	9	8	7	6	
Ausable. ₱ lb	23	24	25	26	28	dis25&10to25&10&10
Putnam, ₱ lb	19	20	21	22	24	dis 15
Essex						33⅓&5
Capewell						33⅓

Burden	₱ keg $4.25
R. I. Horse Shoe Co., Perkins' Imp. at factory	₱ keg $4 25
Mule Shoes, at factory	₱ keg $5.25

Hose, Rubber, Boston Belting Co's.

Standard	70
Extra	50&10
Best	45&10

Ice Picks, Chisels, &c.

Am. Ice Chisel Pol'd	₱ doz. $3.00, dis20

Ice Cream Freezers.

American	50&10
Gem	55&10
Crown	50&10

Ice Tongs.

Champion	₱ doz $4.00, dis 25&10
Family	₱ doz $2.75, dis 20@25

Jack Screws.

Illinois Bolt Co. list	dis 70

Kettles.

Brass. 7 to 17 inches inclusive	₱ lb 22c. net.
Brass larger than 17 inches	₱ lb 24c.
Enameled and Tea Kettles	See Hollow Ware

Keys.

Eagle. cabinet, trunk and padlock	dis 33⅓ and

Knives.

Russell's Butcher	net
Moran's Shoe Knives	dis 20

Knobs.

Carriage, Japanned	₱ gross 80c. dis 60&10
Base, Rubber Tip	dis 70&10&5
Hemacite Door Knobs. new list	dis 40@40&10
Door Mineral	75c
Door Por. Jap'd	90c
Door Por. Por.	3 00@3 25
Door Por. Plated	2 90@3 00

Ladles.

Melting, Sargent's	dis 55&10
Melting. Monroe's Patent, ₱ doz $4.00,	dis 25&10
Melting, P. S. & W	dis 25&10

Lanterns

Tubular No. 0	$5.00 per doz
" " 1	7.00
Tubular. Lift Wire. No. 0, ₱ doz	6.5
Tubular. Lift Wire. No. 1. ₱ doz	7.50
Police. Small. $6.00; Med.. $7.25; Large. $9.75	dis20@2

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1 Counter Shaft and Pulley.
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Alliance, O.

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Cleveland, Ohio.
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STEARNS' SILENT SAW VISES. WITH RUBBER CUSHIONED JAWS.
THE FINEST FINISHED, THE LATEST IMPROVEMENTS, M'F'G'D BY E.C. STEARNS & Co. SYRACUSE, N.Y.
SEND FOR CIRCULAR
SOLD BY THE TRADE

Locks, Bolts, etc.

P. & F. Corbear, Locks & Bronze Goods.

Door locks, knobs and latches.....dis 60
Escutcheons and keys .....dis 60
Padlocks and padlock keys.....dis 66⅔
Bell pulls,mineral, porcelain and jet.....dis 60
Bell pulls, genuine bronze.....dis 60
Lever bell pulls, genuine bronze.....dis 60&10
Butts, genuine bronze.....dis 60&10
Butts, bronze plated.....dis 60&10
Store door locks and latches.....dis 60&10
Store door handles.....dis 60&10
Shutter hinges & flaps genuine bronze....dis 60&10
Shutter hinges, bronze plated.....dis 70
Flush bolts, genuine bronze.....dis 70
Shutter knobs, genuine bronze.....dis 50
Shutter bars, genuine bronze.....dis 60
Sash lifts, genuine bronze .....dis 60
Sash pulls and plates, genuine bronze.....dis 60
Push plates, genuine bronze.....dis 60
Drawer pull genuine bronze.....dis 66⅔
Letter box plates, genuine bronze.....dis 60&10
Barn door locks .....dis 33⅓

Lemon Squeezers.

Porcelain lined.....₱ doz $6 00, dis 25&35
Wood.....₱ doz $3 00. dis 55
The "Boss" .....₱ doz $2.50
Dean's No. 1. ₱ doz $6 50: 2. $3 35;3, $1 90....dis
Little giant.....dis 50

Lasts.

Cotton Chalk.....dis 40
Silver Lake, Braided, N , 0, $6.00; No. 1. $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gross .....dis 25
Masons' Linen.....dis 40
Wire Clothes, No 18, $3.75; No 19, $3.25; No. 20 $2.75;.....

Mallets.

Hickory .....dis 20&10
Lignumvitæ.....dis 20&10
Penfield Block Co., Lignumvitæ and Hickory.....dis 30

Mattocks.

Regular list... ..... dis 60@60&5

Meat Cutters.

Dixon's (P.S.&W.) 1 2 3 4
₱ doz. $14.00 $17.00 $19.00 $30.00 dis 4?
Draw Cut Nos. 5 2 6 8 10
Each.....$50.00 $75.00 $80.00 $225.00 400.00
dis 20@25
Woodruff's (P S & W) per doz No 100 No 150
$15 $18dis 45
Hale's—Nos. 11 12 13
$27 $33 $45 dis 70
Enterprise.....dis 30

Mincing Knives.

Am. (2d quality), ₱ gro, 1 blade, $7; 2 blades, $12; 3 blades, $18.....net
Smith's, ₱ doz. single, $4 50; double, $6 50 dis 40

Money Drawers.

Tucker's ₱ doz.....$18 @20

Molasses Gates.

Stebbins' pat .....dis 70
Stebbins' genuine .....dis 66⅔&10
Stebbins' tinned ends.....dis 40&10
Lincoln's pattern.....dis 66⅔&10
Scoville.....$7 45&10

Nails (wire).

List July 14, 1887.....dis 70
Standard Penny Nails, ₱ keg card rate
{ Car lots.....$2 50
{ Less than car lots, $2 55

Nuts and Washers.

Size of bolt in.....	¼	5-16	⅜	½	⅝	¾	1
Square.....	8¼	7	5½	4½	4	3½	3¼
Hexagon.....	15½	11½	8¼	6	5¼	5¼	5
Washers.....	9	8	7	5	4½	4½	4¼

In lots less than 100 lbs, ₱ lb add ½c, 1lb boxes add 1c to list

Nut Crackers.

Table (Humason & Beckley Mfg. Co.).....dis 40
Blake's pattern.....₱ doz. $2 00, dis 10
Quakenbush.....$5 00 net

Oakum.

Government.....₱ lb 8 c
U. S. Navy.....₱ lb 7¼c
Navy .....₱ lb 6½c

Oilers.

Zinc and Tin.....new list dis 60&10
Brass and Copper.....new list dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz.....dis 10@ 10&10

Packing, Steam.

Boston Belting Co .....dis 60
American Packing. .....10@11c
Russia Packing.....16c
Italian Packing.....16c

Pencils.

Faber's Carpenters' .....high list, dis 50
Faber's Round Gilt.....₱ gro $5.25 net

Picks.

Railroad, 5 to 6 lbs.....$12 dis 60@60&5
... .. 6 to 7 lbs.....$13 dis 60@60&5

Pinking Irons.

₱ doz .....65c. net

Picture Nails.

Brass head, Sargent's list..... } dis 50&10&10
Brass head, combination list.....dis 50&10
Porcelain head Sargent's list, dis.....50&10&10
Porcelain head, combination list.....dis 40&10

Plane Irons.

Sandusky Tool C .....dis 25

Pliers and Nippers.

Button's Patent .....dis 40
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $13.50; No. 4, 7 in., $21 00 ₱ Doz. .....dis 20&10@33⅓
Gas Pliers.....dis 50&10
Humason & Beckley .....dis 50
P. S. & W. Tinners' Cutting Nippers add 6 per cent. dis 10

Plumbs and Levels.

Standard list.....dis 70&10
Pocket levels.....dis 70&10
Davis' inclinometers.....dis 10&10

Post Hole and Tree Augers.

Samson Post Hole Digger..₱ doz. $36.00, dis 20&10
Eureka Diggers.....₱ doz. $15.00 @ $16.00
Champion.....per doz $12.00
Vaughan's Hollow Tube Post Hole.....$24.00 dis40

Potato Parers.

White Mountain.....₱ doz $5.00@$5.50
Antrim Combination.....₱ doz $8.00
Hoosier .....₱ doz $13.50

Pruning Hooks and Shears.

Disston's Combined Pruning Hook and Saw ₱ doz $18.00.....dis 20&10
Disston's Pruning Hook.....₱ doz $12.00 dis 20&10
Pruning Shears .....₱ doz 3.75@$4.00 net

Pulleys.

Hot House .....discount 60&10
Japanned Screw.....discount 60&10
Brass Screw.....discount 60&10
Japanned Side.....discount 60&10
Japanned Clothes Line.....discount 60&10

Pumps.

Cistern, best makers.....dis 50@10&60
Pitcher spout, best makers...dis 60&10@60&10&10
Pitcher spout, cheaper goods... dis 70&5@70&10&5

Punches.

Saddlers' or Drive.....₱ doz. good quality. 65@75c
Bemis & Call Co.'s Cast Steel Drive.....dis 50&5
Bemis & Call Co.'s Springfield Socket.....dis 50&5
Solid Tinners.....₱ doz. $1.44, dis 55

Rails.

Sliding Door, Wrought Brass.....₱ lb 35c dis 20
Sliding Door, Iron, Painted... ₱ foot 6c dis 40&10

Rakes.

Cast Steel..... dis 65&5
Malleable..... dis 65&5

Razors.

J. R. Torrey Razor Co.....dis 20
Wostenholme & Butcher..... $10 @ £...dis 10
Rifle Razor.....$9 50 net

Rivets.

Iron, Thousand, list November 17 .....dis 50
Iron, Ordinary, Cooper's Block and Carriage, list November 17.....dis 50
Copper .....dis 50

Rods.

Stair, Brass.....dis 25&2

Rollers.

Barn door, Sargent's list, ... dis 60&10&10
Acme (Anti-Friction).....dis 55

Rope.

Manilla, ½ inch and over.....11½c
Sisal, ½ inch and over.....11c

Rules.

Boxwood..... ..... discount 80@80&10

Sad Iron.

From 4 to 10 lbs.....per 100 lbs 3c
Self-heating.....₱ doz $9 net
Self-Heating, Tailor's.....₱ doz $18 net
Mrs. Potts's Irons, ... dis 40&10
Enterprise Star Irons.....discount 40&10

Sash Weights.

Per ton .....$22.50@$25.00

Saws.

Disston's Circular..... discount 45
Disston's hand panel, rip &c..... discount 25
W. M. & C., Champion Regular.....per foot 24c
W. M. & C., " Thin Back.....₱ ft 26c

Saw Frames.

White, Vermont.....₱ gross $12 00
Red, polished & varnished ₱ doz $1.50, ...dis 25

Saw Sets.

Aiken's Genuine.....$13.00, dis 50 &10
Morrill Saw Sets No. 1 $15.00; No. 3 and 4 $24.00 .....dis 40 &10

Scales.

Hatch, Counter, No. 171 .....₱ doz $21.00
Hatch, Tea, No. 161.....₱ doz $6.75@7.00
Chatillon's Grocers .....dis 50
Family Turnbulls.....dis 30@30&10
Scale Beams, List of January 12, 1882 dis 50&10

Scrapers.

Adjustable Box Scraper (S. R. & L. Co.) $6.50.....dis 30&10
Box, 1 Handle.....₱ doz $4.00, dis 10
Foot.....dis 50&10

Screw Drivers.

Stanley R. & L. Co.'s Varnished Handles dis 65&10
Stanley R. & L. Co.'s Black Handles.....dis 60&10
Sets Interchangeable.....₱ doz $18.00 dis 25

Screws.

Wood Screws—List Jan 27, 1881.

Flat head iron.....	dis 70	Extra ...10 often given
Round head iron.....	dis 65	
Flat head brass.....	dis 65	
Round head brass.....	dis 60	
Flat head bronze	65	
Round head bronze.....	60	
Machine, flat head, iron.....	dis 55	
Machine, round head, iron	50	

Bench and hand—

Bench, iron	25&10
Bench, wood, beech, per dozen $2.25.....	
Bench, wood, hickory.....	20 & 10
Hand, wood.....	20&10
Lag or coach.....dis	66⅔@70
Coach, patent gimlet point.....	66⅔@66⅔&5
Bed.....	25&5
Hand rail, ...	66⅔&10

Saw Tools.

Atkins' patent.....₱ doz sets $6 00

Shears.

American (Cast) Iron.....dis 75&10
Pruning .....See Pruning Hooks and Shears
Garnard's Lamp Trimmers.....₱ doz $4.00
Tinners' .....dis 20&2
Seymours List, Dec. 1881..... dis 60 &10&5
Seymours Tailor's Shears.....dis 33⅓

Scroll Saws.

Lester, complete, $10.00.....dis 25
Rogers, complete, $4.00. .....dis 25

Sheaves.

Sliding Door R. & E. list Dec 18, 1885... dis 55&2
Sliding Door, Patent Roller.....dis 60&10&2
Sliding Door, Pat'nt Roller, Hatfield's..... dis 70
Sliding Door, Corbin's Anti-Friction Dec. 18, 1885 dis 60&2

Ship Tools.

L. & I. J. White.....dis 20 & 5

Shovels and Tongs.

Iron Head.....50&10&5
Brass Head.....50

Sieves.

Metallic, new list.....dis 60&10

Flour sifters { Victor..... $2 00
Flour sifters { Hunter..... $2 25
Flour sifters { Comet..... $1 25

Slates.

School, by case..... dis 50&5@50&10

Spoke Shaves.

Iron.....dis 30
Wood .....dis 30

Spoke Trimmers.

Bonney's.....₱ doz $10.00 dis 50
Stearns'.....₱ doz $9.00 dis 20&10

Spoons.

Basting Spoons .....dis 30&10
Britannia. .....dis 50
Rogers Bros. .....dis 50&10

Squares.

Steel and iron ..... } dis 70@70&10
Nickel plated..... }
Disston's try square and T bevels..... dis 45
Winterbottom's try and miter.....dis 30&10

Steelyards.

dis 40&10@50

Stocks and Dies.

Blacksmith's .....dis 35
"Lightining" screw plate .....dis 15

Stone.

Hindostan, No. 1, 6c; Axe, 4½c; Slips 9c
Washita Stone .....No. 1, ₱ lb 20
Turkey Oil Stone.....4 to 8 in.....₱ lb 40c
Turkey Slips.....$1.00@1.50
Washita Slips No 1.....₱ lb 37@38
Washita No 2 stone.....₱ lb 15c
Arkansas Stone 2.00

Stove Boards.

Zinc.....70
Daisy.....70

Shovels and Spades.

Ames' list Nov 1 1885..... .....discount 26
Dennis.....5.50
Hussey & Binns, rail road 8.00

Stove Polish.

Joseph Dixon' s.....₱ gross $6 00 dis 10
Gem .....₱ gross 4 50 dis 10
Gold medal.....₱ gross 6 00 dis 25
Rising Sun.....₱ gross $5 50 net
Dixon's plumbago .....₱ lb 8c. net

Trowels.

Lothrops' Brick and Plastering.....dis 25
Reed's Brick and Plastering..... .....dis 25
Disston's Brick and Plastering... dis2n
Brade's brick..... dis 20

Tacks, Brads, &c.

New List, September 1, 1882. & Supplement Jan-1, 1886.

American iron carpet tacks all kinds dis..72½&10
Steel carpet tacks all kinds.....72½&10@10
Swedes Iron carpet tacks all kinds .....72½&10
Swedes iron tacks.....67½&10
Swedes iron Upholsterers' tacks.....67½&10
Tinned Swedes iron tacks.....67½&10
inned Swedes iron Upholsterers' tacks. ....67½&10
American iron cut tacks .....70&10
Copper tacks .....33⅓&10
Copper finishing and trunk nails.....33⅓&10
Cigar box nails .....45&10
Finishing nails.....60&10
Hungarian nails and miners' tacks.....60&10
Gimp and lace tacks.....67½&10
" " " tinned.....67½&10
Trunk and clout nails.....60&10
Tinned trunk and clout nails.....60&10
Basket nails.....60&10
Chair nails .....60&10
Common and patent brads.....60&10
Tinned capped trunk nails.....60&10

Tinware.

Stamped, Japaned & Pieced, list Jan. 20, 1887..... .....dis 70&10

Tobacco Cutters.

Enterprise Mfg. Co (Champion).....dis 20&10@30

Traps.

Game, Newhouse.....dis 35
Victor.....60&10
Wood, mouse.....15c ₱ doz holes
Delusion, mouse.....₱ gross $18 00 dis 15

Tramom Lifters.

Wollensak's Patent..... dis 50

Twine.

	BC.	P.
No. 12, Flax Twine, ¼ and ½ lb Balls...	21½c	27c .....
No. 18, " " ¼ and ½ "	21½c	27c .....
No. 36, " " ¼ and ½ "	20c	25c .....
2-Ply Hemp, ¼ and ½ lb Balls (Spring Twine)	17	
3-Ply " 1 lb Balls.....	17½c	
3-Ply " 1¼ lb Balls	16c	
Cotton Wrapping, 5 Balls to lb.....	15@16c	

Vises.

Solid box.....50&10&5@60
Parker's.....discount 20@25
Prentiss....." 20 &5@25
Stephen's....." 25
Saw Filers, Wentworth's .....dis20&10
Saw filers, Stearn's .....3½%&10

Washer Cutters.

Smith's Patent .....₱ doz $12 00, dis 20&10&10
Johnson's.....₱ doz $11 00, dis 33⅓
Penny's.....₱ doz Pol. $14 00; Jap'd. $16 00, dis 55
Appleton's.....₱ doz $16 00, dis 60&10
Bonney's.....dis 30&10

Well Wheels.

8 in., $2.00; 10 in., $2.50; 12 in., $3.25

Wire. New List Jan. 18. 1884

Brass and Copper..... discount 20
Bright and annealed, Nos. 0 @18 ... dis70&5@72½
" " Nos. 19 @ 26.....dis 72½@75
" " Nos. 27 @ 36 dis 75@75&10
Coppered Nos. 0 to 18, market list.....dis 65&10@70
Galvanized Nos. 0 to 18 " " dis 60&7½@65
Tinned market Nos. 0 to 18,..... dis 65
Cast steel ..... dis 50
Tinned Broom Wire.....dis70@72½
Annealed Fence, Nos. 8 and 9..... dis75
Annealed Grape, Nos. 10 to 14..... dis 75
Stubs Steel Wire regular.....$6 00 @ lb dis30

Wrenches.

Coe's genuine, cash in 10 days..... 55 & 3
Girard Standard.....discount 70&10
Agricultural.....discount 75&10
Mechanics' .....dis 55&10 & 3
Bemss & Call's Combination..... 25&10
Donohue's Engeneers' 25

TINNERS' STOCK.

Tin.

Banca } Market advancing
Straits } add excited. Quo-
English } tations on appli-
Bar } cation.

Spelter.

American, cash, ₱ lb.....

Charcoal Tin Plate.

IC 12x12 225 sheets..... $6 00@6 50
IX 14x20 112 sheets..... 7 25@8 00
IC 10x14 225 sheets.....₱ box 5 75@6 25
IC 20x28 112 sheets.....12 25@14 00
IX 10x14 225 sheets ..... 7 25@8 00
IX 12x12 225 sheets ..... 7 75@8 25
For each additional X add $1.90@3.00

Coke Tin Plate.

	Best	Ordinary
IC 10x14 } IC 14x20 }	$5 60	

Solder.

Half and Half, in bars warranted } Quotations
No. 1, Refined..... } only
Bingham..... } application.

Zinc.

Zinc, cask.....6¼
inc, open.....6¾

LEAD.

Pig.....5
Bar. ₱ lb.....6
Pipe. ₱ lb..... 6½c, net
Sheet. ₱ lb.....6 net
Chilled Shot ₱ bag 25 lbs 1 35

BABBIT METAL.

No. 4.....6
Allens.....9¼
Excelsior.....15
W. B. Genuine.....25

COPPER.

Lake Ingot..... 17
Arizona..... 15¾

IRON AND STEEL.

Flat Bar

1¼ to 4 by ⅜ to 1 inch.....1 75
4¼ to 6 by ⅜ to 1 inch.....1 85
1¾ to 6 by 1¼ to 2 inch.....2 15
1¼ &1¾ by ⅜ to ¾.....1 85
1 &1½ by ⅜ to ¾.....1 85
⅝, ¾ and ⅞ by ⅜ to ¾.....2 15

Round and Square.

1 to 1¼ inch.....1 75
2 to 2¾ 1 95
2¾ to 3¼ inches.....2 25
3¾ to 4 .....2 75
4¼ to 4½ 3 25
4¾ to 5 .....3 45

Oval.

⅜ to 1¼ inch.....2 15
⅜ to ¾ 2 35
½ 2 55
⅝ 2 95

Half Oval and Half Round.

1¼ to 3 inch.....2 85
⅜ to 1¼ 2 45
⅜ to ¾ 2 95
½ 3 25
⅝ 4 75

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch..... 1 95
1 to 1¾ by ¼ and 5-16 inch.....2 05
¾ to ⅞ by ¼ and 5-16 inch.....2 25
½ to ⅝ by ¼ and 5-16 inch.....2 75

Hoops.

1¼ to 4, Nos. 13 to 15.....2 55
1¼ to 2, Nos. 16 to 18.....2 65
1¼ to 2, No. 19.....2 75
1¼ to 2, No. 20.....2 85
1¼ to 2, No. 21.....2 95
1¼ to 2, No. 22.....3 05
15-16, 1 and 1⅛, Nos. 13 to 15.....2 75
15-16, 1 and 1⅛, Nos. 18 to 18.....2 85
15-16, 1 and 1⅛, Nos. 19 and 20.....2 95
15-16, 1 and 1⅛, No. 21.....3 05
15-16, 1 and 1⅛, No. 22.....3 25
⅞, Nos. 13 to 15.....2 95
⅞, Nos. 16 to 18.....3 05
⅞, Nos. 19 and 20.....3 15
⅞, No. 21.....3 25
⅞, No. 22.....3 35
13-16, Nos. 13 to 15.....3 15
13-16, Nos. 16 to 18.....3 25
13-16, Nos. 19 and 20.....3 35
13-16, No. 21.....3 45
13-16, No. 22.....3 55
¾, Nos. 13 to 15.....3 25
¾, Nos. 16 to 18.....3 35
¾, Nos, 19 and 20.....3 45
¾, No. 21.....3 55
¾, No. 22.....3 65
11-16, Nos, 13 to 15.....3 45
11-16, Nos. 16 to 18 .....3 55
11-16, Nos. 19 and 20.....3 65
11-16, No. 21.....3 75
11-16, No, 22.....3 85
⅝, Nos. 13 to 15.....3 85
⅝, Nos. 16 to 18.....3 85
⅝, Nos. 19 and 20.....3 95
⅝, No. 21.....4 05
⅝, No. 22.....4 15
⅝, No. 23.....4 25

Light Band.

1¼ to 6 by ¼ to 3-16 in.....2 2
1½ to 6 by Nos. 11 and 12.....2 3
1 to 1⅝ by ¼ to 3-16 in.....2 3
1 to 1⅝ by Nos. 11 and 12.....2 4
⅞ and 13-16 by ¼ to 3 16 in.....2 6
⅞ and 13 16 by Nos. 11 and 12.....2 7
⅞ and 11-16 by ¼ to 3-16 in.....2 9
⅞ and 11-16 by Nos. 11 and 12.....3 0
⅞ and 9-16 by ¼ to 3-16 in.....3 2
⅞ and 9-16 by Nos. 11 and 12.....3 3
½ by ¼ to 3-16 in.....3 5
½ by Nos. 11 a d 12.....3 6

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12.....2 75
⅞ inch, " " " 13 and 14.....3 05
¾ inch, " " " 11 and 12 .....3 05
¾ inch, " " " 13 and 14.....3 25

Sheet Iron.

No. 10 to 4.....2 45
No. 15 to 17.....2 65
No. 18 to 21.....2 75
No. 22 to 24.....2 95
No. 25 to 26.....2 95
No. 27.....3 05
No. 28 .....3 25

Iron Boiler Plates.

Tank, ¼ inch and heavier.....2 45
C No. 1, " 2 70
C H No. 1, " 2 95
C H Flange, " 3 65
Extra Flange, " 4 05
Solid Fire Box, " 4 95

Steel Boiler Plates—1-4 in. and heavier.

Tank $2 55
Shell $3 05
Flange.....$3 30
Marine Flange.....$3 80
Fire Box.....$4 45
Above includes plates 90 inches wide.
90 to 96 in. wide..... ½c. ₱ lb extra.
96 to 100 in. wide.....1 c. "
100 to 104 in. wide.....1½c. "
104 to 116 in. wide.....special.

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ₱ lb
to 2 in. inclusive.....	.09
9-16 to ½ in. "	.09
7-16 to ⅝ and 2⅛ to 3 in.....	.10¼
3⅛ to 4 in.....	.10
⅝ to 11-16 and 4½.....	.11¼

TRAVELER'S RECISTER.

Standard Time.
Revised March 6th, 1888.

N. Y. C. & St. L. R. R. Co.— 'The Nickel Plate."

EASTWARD.	ARRIVE.	DEPART
Buffalo Passenger	10 40 a m	10 45 a m
Chicago Passenger	9 20 p m	.....
Local Freight	4 40 p m	5 45 a m
WESTWARD.	ARRIVE.	DEPART.
Chicago Passenger	.....	6 30 a m
Fostoria Passenger	4 46 p m	4 51 p m
Local Freight	5 20 p m	5 50 a m

Rocky River Accommodation departs 7:40 a. m.; 1:40 p. m.
Euclid Accommodation departs 6:24 a. m. 12:10 a. m., 5:35 p. m.
All trains daily, except Sunday.

Cleveland & Pittsburg

	ARRIVE.	DEPART.
New York Express	12 45 p m	7 45 a m
New York Express	6 55 p m	1 40 p m
Alliance & Akron Accom.	9 35 a m	3 25 p m
Ravenna Accommodation	8 25 a m	5 00 p m
Night Express	* 5 25 a m	*11 10 p m

Train leaving at 1:40 p. m. has Pullman Buffet Sleeper from Cleveland to New York.
*Daily; all other trains daily except Sunday.

Mt. Vernon & Pan Handle Route

C., A. & C. Ry. Co.	ARRIVE.	DEPART.
Akron, Col. & Cin. "Flyer"	5 40 p m	8 10 a m
Akron, Col. & Cin. Night Express	7 35 a m	8 00 p m
Akron & Columbus Exp.	12 45 p m	1 40 p m
Akron & Orrville Accom.	9 35 a m	3 25 p m

The 8 p. m. train runs daily. Elegant Pullman palace sleeping cars attached. All other trains daily except Sunday.

Erie Railway.
Depot, South Water St. and Viaduct.

	ARRIVE.	DEPART.
N. Y. & Pitts. Express	15 58 a m	*8 25 a m
Fast N. Y. & Pitts. Express	*10 55 a m	*3 00 p m
Mahoning Accommodation		†6 40 a m
Pittsburgh Express	† 6 25 p m	
Youngstown Local	†8 05 a m	
Mahoning div. and Pitts Local		*11 40 a m
Mahoning Val Accom		*4 30 p m
Pittsburgh Express	†1 20 p m	11 10 p m
New York Express	*8 00 p m	.....

* Daily. † Daily except Sunday. ‡ Daily except Monday.

Lake Shore & Michigan Southern Railroad.

TRAINS GOING EAST.	Arrive from West.	Depart East.
No. 4, Fast Limited Ex	2 55 a m	*2 55 a m
No. 6, N. Y. & Bos. Ex	*1 35 a m	*1 40 a m
No. 8, N. Y. B'f'o & At. Ex	*8 25 a m	*8 50 a m
No. 26, Elyria Accom	†7 45 a m	.....
No. 10, Toledo & Sandusky Accommodation	†1 05 a m	.....
No. 24, Buffalo Accom	.....	†7 00 a m
No. 10, N. Y. & Boston "Flyer,"	.....	*11 50 a m
No. 12, N. Y. & Bos. Ex.	*2 35 p m	*3 00 p m
No. 2, Night Express	†9 40 p m	†10 00 p m
No 26, Conneaut Accom	.....	†4 25 p m
TRAINS GOING WEST.	Arrive from East.	Depart West.
No. 1, Fast Limited Ex	*12 15 a m	*12 15 a m
No. 23, Cleveland Express	*2 15 a m	.....
No. 3, Chi. Ex. via Sand'y	15 30 a m	†5 45 a m
No. 25, Mich. Ac. via Norw'k	.....	†5 45 a m
No. 21, Toledo Ex. via Norwalk and Sandusky	†12 50 p m	†3 20 p m
No. 5, Fast St. Louis & Chicago Ex. via Sandusky	*10 50 a m	*10 55 a m
No. 9 hi. Pac. Ex. via Nor'k	*6 55 p m	*7 15 p m
No. 31, Elyria Accommodation, to Elyria only	.....	†4 30 p m
No. 27, Conneaut Accom	†8 10 a m	.....

Sunday train for Nottingham— Depart 8:15 a. m. and 1:00 p. m.; arrive 9:20 a. m. and 4:45 p. m.
Reference marks—*Daily. †Daily except Sunday. ‡Daily except Monday.
A local Cleveland and New York Sleeper and dining car daily on No. 10, leaving Cleveland at 11:50 a. m., arrives Grand Central Depot, New York 7:30 a. m.
For further information as to trains and connections apply at the Union Ticket Office, corner Bank & Superior-sts., under Mercantile Bank.

M. E. GAUL, City Pass. Ag't. A. J. SMITH, Gen'l Pass. & Ticket Ag't.

Cleveland and Canton Railroad.

Arrive.—Canton, Sherrodsville and Coshocton 9 55 a.m., 7 00 p.m.
Kent —*7 50 a.m., *7 16 p.m.
Bedford—*7:50 a.m., 1:05 p.m., 7 16 p.m.
Newburgh and Miles avenue—7:10 a.m., 4:15, p.m. 5:33 p.m.
Depart—
Canton, Sher'dsville & Cosh't'n—7:00 a.m. and 3:10 p.m.
Kent—*8:38 a.m. and *8:30 p.m.
Bedford—*8:38 a.m., 4:45 p.m., 11:10 a.m., 5:45 p.m.
Newburgh and Miles Avenue—6:12 a.m., 2:00 p.m., 4:40 p.m.
Trains marked with * run daily. All others daily except Sunday.
Depot at Ontario street and Huron street

Cleveland, Lorain and Wheeling.

	DEPART.	ARRIVE.
Wheeling Express	6 45 p m	6 55 p m
Ubrichsville Express	4 00 p m	9 20 a m

Pittsburgh & Lake Erie Railroad.

On and after Jan. 2, 1888, passenger trains will depart from and arrive at the Pittsburgh and Lake Erie Depot at Pittsburgh, as follows, Central time:

P. & L. E. R. R. Depart for—

No. 1, Cleveland, Bradford and East	5 25 a.m
No. 5, Buffalo, St. Louis, Cleveland	7 45 a.m
No. 5, Beaver Falls Accommodation	8 40 a.m
No. 7, Buffalo, New York, and all New England points	10 15 a.m
No. 9, Chicago, Cincinnati, St. Louis	1 10 p.m
No. 11, Buffalo Express	3 30 p.m
No. 13, Beaver Falls Accommodation	5 20 p.m
No. 15, Buffalo Express	10 30 p.m

Arrive from—

No. 2 Beaver Falls Accommodation	5 25 a.m
No. 4, Buffalo and Cleveland Night Exp.	6 55 a.m
No. 6, Youngstown Accommodation	9 20 a.m
No 8 Beaver Falls Accommodation	12 40 p.m
No. 10, Chicago, Cincinnati & St. Louis	1 35 p.m
No. 12, Buffalo Express	5 45 p.m
No. 14, Cincin., St. Louis and Cleveland	8 05 p.m
No. 14, Cleveland & Buffalo Express	10 35 p.m

Pittsburgh & Lake Erie trains Nos. 4, 15, 8 and 10 daily.

E. HOLBROOK, General Superintendent.
R. W. JONES, Master of Transportation.
A. D. SMITH, Gen'l Pass. Ag't, Pittsburgh.

WHEELING & LAKE ERIE

TIME TABLE—IN EFFECT JAN. 8, 1888.
Central Standard Time.

EASTWARD.	No. 5.	No. 7.	No. 9.*	No. 1.*
Toledo.....lv	7 45 AM	1 10 PM	4 50 PM	.....
Oak Harbor...ar	8 41	2 05	5 45	.....
Fremont.....	9 06	2 30	6 10	.....
Clyde.....	9 22	2 47	6 25	.....
Bellevue	9 37	3 03	6 40	.....
Monroeville..lv	9 55	3 20	6 58	3 10 AM
Norwalk.....	10 10	3 40	7 15	3 22
Wellington.....	11 00	4 32	8 08	4 00
Creston.....	11 53	5 20	9 05 PM	4 47
Orrville.....ar	12 20 PM	5 48	9 40 PM	5 15*
Orrville.....lv	12 40	5 53	7 05 AM	7 05
Massillon.....ar	1 20	6 35	7 52	7 52
Massillon.....lv	1 20	6 35	7 52	7 52
Navarre.....	1 35	6 50	8 10	8 10
Valley June.lv.	2 20	7 35	8 55	8 55
New Cumberl'd	2 23	7 48	9 10	9 10
Sherrodsville...	2 45	8 00	9 25	9 25
Leesville.....	2 52	8 08	9 40	9 40
Bowerston.....ar	2 58 PM	8 15 PM	9 50 AM	9 50 AM
Canal Dover.....	2 57 PM	.....	.....	.....
New Comerst'n	3 58	.....	.....	.....
Cambridge.....	4 35	.....	.....	.....
Macksburg	6 02	.....	.....	.....
Marietta.....ar	7 13 PM	.....	.....	.....

WESTWARD.	No. 6.	No. 8.	No. 4.	No. 2.*
Marietta lv	6 45 AM	2 20 PM	.....	.....
Macksburg	7 55	1 30	.....	.....
Cambridge.....	9 25	3 00	.....	.....
New Comerst'n	10 23	3 58	.....	.....
Canal Dover.....	11 04 AM	4 38 PM	.....	.....
Bowerston.....	11 25 AM	3 45 PM	5 55 AM	.....
Leesville.....	11 32	3 55	6 02	.....
Sherrodsville...	11 40	4 10	6 10	.....
New Cumberl'd	11 52	4 25	6 22	.....
Valley June.....	12 20 PM	5 02	6 45	.....
Navarre.....	12 50	5 35	7 35	.....
Massillon.....	1 05	5 50	8 00	.....
Orrville.....ar	1 40	6 25	8 55	.....
Orrville.....lv	1 45	6 35*	9 13	.....
Creston..... lv	2 18	7 02	9 42	.....
Wellington	3 05	7 43	10 33	.....
Norwalk.....	3 55	8 25	11 30	7 25 AM
Monroeville	4 07	8 35	11 45	7 35
Bellevue.....	4 23	9 45	11 59	7 51
Clyde	4 39	10 00	12 15 PM	8 06
Fremont.....	4 55	10 17	12 30	8 23
Oak Harbor.....	5 20	.....	12 53	8 45
Toledo.....ar	6 20 PM	11 15*	1 50 PM	9 40 AM

No. 27	No. 25	Huron Divis'n.	No. 26	No. 28
4 50 PM	7 40 AM	Ar.. Huron ..Lv	8 55 AM	5 30 PM
4 32	7 22	Friese Landing	9 10	5 45
4 20	7 10	.....Milan	9 28	6 03
Lv 3 55	Lv 6 45	.....Norwalk.....	Ar 9 55	Ar 6 30
Ar PM	Ar AM		Lv AM	Lv AM
.....	.....	...Monroeville...	.....	.....

* Daily.
This road is now open through from Toledo to Bowerston, connecting with the Pennsylvania System for all points East.

THROUGH CAR SERVICE.

Between Toledo, Cambridge and Marietta.
" " and Bowerston.
" " and Akron, Youngstown and Pittsburgh.
" Chicago, Akron, Youngstown and Pittsburgh.

M. D. WOODFORD, Gen'l Manager. JAMES M. HALL, Gen'l Pass. Agt.

Scioto Valley Railway

TIME TABLE.
In effect May 27, 1888.
THE SHORT LINE TO ALL POINTS
North and South, East and Southeast, West and Northwest.

TRAINS GOING SOUTH.

STATIONS.	No. 2.	No. 4.	No. 6.
Columbus.....Lv	7 10 a.m	11 25 a.m	5 25 p.m
Valley Crossing...	7 30 "	11 44 "	5 45 "
Lockbourne	7 41 "	11 53 "	5 56 "
Ashville.....	7 55 "	12 07 p.m	6 10 "
Circleville.....	8 15 "	12 26 "	6 30 "
Kingston.....	8 34 "	12 44 "	6 49 "
Chillicothe	9 01 "	1 30 "	7 35 "
Sharon	9 36 "	2 05 "	8 10 "
Waverly.....	9 46 "	2 14 "	8 20 "
Piketon.....	9 58 "	2 27 "	8 33 "
Big Run.....	10 12 "	2 41 "	8 47 "
Lucasville.....	10 27 "	2 57 "	9 03 "
Portsmouth	10 50 "	3 20 "	9 25 "
Sciotoville.....	11 05 "	3 35 "	9 40 "
Wheelersburg	11 10 "	3 40 "	9 45 "
Havernill	11 29 "	3 59 "	10 04 "
Hanging Rock.....	11 40 "	4 10 "	10 15 "
Ironton	11 50 "	4 20 "	10 25 "
Petersburg	12 00 m.	4 30 "	10 35 "
Ashland.....Ar	12 30 p.m	5 00 p.m	11 05 p.m

Trains Nos. 2 and 4 daily, except Sunday.
Train No. 6 daily.
Train No. 6 takes supper at Chillicothe.

TRAINS GOING NORTH.

STATIONS.	No. 1.	No. 3.	No. 5.
Ashland Lv	2 45 a.m	9 05 a.m	5 35 p.m
Petersburg	3 15 "	9 35 "	6 05 "
Ironton	3 26 "	9 46 "	6 15 "
Hanging Rock	3 36 "	9 56 "	6 25 "
Havernill.....	3 46 "	10 07 "	6 36 "
Wheelersburg	4 06 "	10 28 "	6 55 "
Sciotoville.....	4 12 "	10 33 "	7 00 "
Portsmouth.....	4 27 "	10 05 "	7 15 "
Lucasville.....	4 49 "	11 14 "	7 37 "
Big Run.....	5 04 "	11 32 "	7 53 "
Piketon.....	5 18 "	11 48 "	8 07 "
Waverly.....	5 30 "	12 01 p.m	8 20 "
Sharon	5 40 "	12 11 "	8 30 "
Chillicothe	6 35 "	1 10 "	9 06 "
Kingston.....	7 01 "	1 26 "	9 31 "
Circleville.....	7 20 "	1 36 "	9 49 "
Ashville.....	7 40 "	1 55 "	10 08 "
Lockbourne	7 55 "	2 15 "	10 22 "
Valley Crossing...	8 06 "	2 39 "	10 31 "
Columbus.....Ar	8 30 a.m	3 00 p.m	10 50 p.m

Train No. 1 daily.
Trains Nos. 3 and 5 daily, except Sunday.

COUPON TICKETS, by the best routes and to all principal points in the United States and Canada, can be found at the following Stations: Columbus, Circleville, Kingston, Chillicothe Waverly, Portsmouth, Ironton, A. C. & I. Ashland.

For further information relative to rates, connections and through time, call on your Ticket Agent, or address J. ROBINSON, Receiver.
JNO. J. ARCHER, Gen'l Pass. & Ticket Ag't. Columbus, Ohio.

Ft. Wayne, Cincinnati & Louisville RAILROAD.

THE POPULAR ROUTE
BETWEEN THE
NORTH and SOUTH
THE DIRECT ROUTE TO OR FROM
FORT WAYNE,
INDIANAPOLIS,
TERRE HAUTE,
EVANSVILLE,
AND ST. LOUIS.

13 MILES SHORTER —BETWEEN— **13**
Fort Wayne and Indianapolis
Than any other Route.

22 MILES SHORTER AND QUICKER **22**
By **3 HOURS**, Between
Louisville and Fort Wayne.

Ask for Tickets
—VIA—
Ft. Wayne, Cincinnati & Louisville Railroad.

For sale by all Agents of connecting lines, EAST, WEST, NORTH AND SOUTH.

W. W. WORTHINGTON, Gen'l Supt. S. A. WIKEL, Gen'l Ticket Agent, FORT WAYNE, IND.

The Picturesque Lehigh Valley Route.

Two through trains with Pullman cars attached are now run via by this beautiful scenic route, between Suspension Bridge, Buffalo, New York and Philadelphia, leaving Suspension Bridge 8:35 A. M. and 3:40 P. M., Buffalo 9:15 A. M. and 5:15 P. M., connecting with all trains from the West.

Passengers between the East and West passing over the famed LEHIGH VALLEY ROAD will experience the pleasure of a trip through the most magnificent and picturesque scenery in the world, presenting an ever varying panorama of delightful surprises.

Double track, steel rails, magnificent road bed and unrivaled equipment, all combine to make the LEHIGH VALLEY the favorite and most desirable route between the East and the West.

Anthracite Coal is used entirely, guaranteeing the passengers perfect freedom from the dense volumes of smoke that so greatly annoy passengers on lines using Bituminous Coal.

E. B. BYINGTON, Gen'l Pass. Agent Bethlehem, Pa.

GRAND EXCURSIONS

THURSDAY, AUG. 2d.

To Put-in-Bay Fare $1.00. } On Palace Steamer **City of Cleveland.**

Steamer leaves 23 River St. at 9.00 A. M., city time, returning at 6.30 P. M.

TO DETROIT Fare $2.00. } Changing to Steamer **City of Detroit**

Returning at 5.30 next morning, in time for business.

Brass and String Music. 2½ Hours at the Bay.

Detroit & Cleveland STEAM NAVIGATION CO.

Week Days **FOR DETROIT** 9.00 P. M.

Special Sunday Night and Thursday Morning Trips, July and August.

Four Trips **For Mackinac** per Week, and Lake Huron Way ports.

All Departures from 23 River Street.

E. B. WHITCOMB, G. P. A. T. F. NEWMAN, G. A

Valley Short Line.

CLEVELAND, AKRON, CANTON & MARIETTA.

DEPART.
No. 1, Mail, 7:30 a m daily.
No. 3, Fast Express, 11:20 a m, daily, except Sunday.
No. 5, Youngstown Accommodation, 2:30 p m, daily, except Sunday.
No. 7, Fast Express, 4:30 p m, daily.
No. 9, Akron Accom., 7:45 p. m., daily.

ARRIVE.
No. 2, Cleveland Accom, 7:45 a m daily.
No. 4, Fast Express, 9:55 a. m., daily.
No. 6, Fast Express, 2:30 p m, daily, except Sunday.
No. 8, Cleveland Accom., 5:45 p m, daily, except Sunday.
No. 10, Mail, 7:15 p m, daily.
Depot—South Water Street.

WM. THORNBURGH, General Manager, R. A. CARRAN, Gen. Pass. Ag't.

ERIE RAILWAY

THE FAVORITE
AND
Picturesque Route
TO
New York, Boston and the East.

THE SHORTEST AND QUICKEST ROUTE TO PITTSBURGH, WASHINGTON AND BALTIMORE, AND THE SOUTHEAST.

Change of time goes into effect May 20, 1888.
Central, or Ninetieth Meridian time, 33 minutes slower than Cleveland city time.
Until further notice trains will leave from the New Central Depot, South Water Street and Viaduct, as follows:

	Depart.
No. 62, Mahoning Valley Accommo	† 6 40 a m
No. 72, New York Express	* 8 30 a m
No. 72, Fast Pittsburgh Express	* 8 30 a m
No. 64, Fast New York Express	* 3 00 p m
No. 64, Pittsburgh Express	* 3 00 p m
No. 66, Youngstown Accommo	* 5 00 p m
No. 68, Pittsburgh Express	†11 10 p m
No. 68, New York Express	†11 10 p m
No. 70, Pittsburgh Local Express	*11 40 a m
No. 74, Shenango Valley Express	† 4 00 p m
	Arrive.
No. 73, Shenango Valley Express	† 9 23 a m
No. 61, New York Express	† 5 45 a m
No. 61, Pittsburgh Express	† 5 45 a m
No. 65, Fast New York Express	*10 55 a m
No. 65, Pittsburgh Express	*10 55 a m
No. 67, Pittsburgh Express	† 1 20 p m
No. 63, New York Express	* 7 05 p m
No. 69, Pittsburgh Express	* 8 40 p m
No. 77, Youngstown Local	* 7 25 a m
No. 13, Erie Express, carrying express matter only, from all points East and South-east, carries no passengers (except Monday)	† 1 20 p m

* Daily. † Daily, except Sunday.

☞This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City and intermediate points without change. No change to Boston and New England cities.

Baggage checked through to all points East.
Through tickets and information regarding the route can be obtained at office, 141 Superior street, and at Central Depot, South Water street and Viaduct, Cleveland. **Ship by Erie Express.**

E. B. THOMAS, 2d Vice President, Cleveland, O.
L. P. FARMER, Gen'l Pass. Agent, New York.
W. C. RINEARSON, Ass't G. P. A., Cincinnati, O
M. L. FOUTS, City Passenger Agent, 141 Superior Street, Weddell House, Cleveland, O.

Cleveland & Marietta R. R.

THROUGH LINE BETWEEN
Marietta, Caldwell, Cambridge, Newcomerstown, Canal Dover, Canton, Akron, Cleveland, Buffalo, Toledo Pittsburgh, New York, Coshocton, Newark, Zanesville, Columbus, Chicago and St. Louis.

In effect April 22d, 1888.

GOING NORTH.			GOING SOUTH.	
No. 4.	No. 2.	STATIONS.	No. 1.	No. 3.
9 55 AM	2 00 AM	..Parkersburg...	2 45 PM	11 55 AM
12 20 PM	6 45	.....Marietta.....	10 15 AM	7 13
12 40	7 05	.....Caywood.....	9 55	6 53
12 46	7 11	.....Stanley.....	9 49	6 47
1 00	7 25	.....Whipple.....	9 35	6 32
1 10	7 35	.....Warner.....	9 25	6 22
1 23	7 48	.....Elba.....	9 12	6 09
1 30	7 55	...Macksburg...	9 05	6 02
1 37	8 01	...Dexter City...	8 58	5 55
1 41	8 05	...South Olive...	8 54	5 50
1 48	8 12	.....Dudley.....	8 47	5 43
1 57	8 20	.....Caldwell.....	8 40	5 36
2 07	8 30	..Belle Valley...	8 30	5 26
2 17	8 40	.....Ava.....	8 19	5 16
2 29	8 52	..Pt. Pleasant...	8 07	5 04
2 42	9 04	.....Byesville.....	7 53	4 50
3 00	9 25	...Cambridge...	7 36	4 35
3 07	9 32	.....Oldham's.....	7 27	4 27
3 14	9 40	.....Miller's.....	7 20	4 20
3 24	9 50	...Kimbolton...	7 10	4 10
3 39	10 05	.....Guernsey.....	6 56	3 56
3 47	10 12	.....Post Boy.....	6 49	3 47
3 58	10 23	N. Comerstown	6 40	3 38
4 05	10 30	..... Wolf's	6 31	3 29
4 17	10 43	..Phillipsburg..	6 20	3 17
4 22	10 48	..Black Band....	6 14	3 12
4 28	10 54	....Turner's.....	6 09	3 06
4 38	11 04	...Canal Dover..	6 00 AM	2 57
5 00	11 27	ar. Vall'yJ'n. lv		2 35
5 02	11 35	lv. Vall'yJ'n. ar		2 20
	12 19 PM	.....Canton.....		1 30
	1 12	..... Akron.....		12 31
	2 36	... Cleveland.....		11 20 AM
	8 00	.....Buffalo		5 40
11 15 PM	6 20	.....Toledo.....		7 05

Train No. 8 leaves Marietta at 1 40 p. m., Whipple 2 40, Warner 3 00, Elba 3 20, Macksburg 3 35, Dexter City 3 47, Caldwell 4 25, arriving Cambridge 6 30 p. m. Train No. 5 leaves Valley Junction at 5 13 p. m., arriving at Canal Dover 5 35 p. m.

Through coaches on trains Nos. 2 and 3 between Marietta, Canton, Akron, Cleveland and Toledo. Close connections made at Mariett with C., W. & B., M., C. & N., Z. & O., and Ohi River Packets; at Cambridge with B. & O., eas and west; at Newcomerstown with P., C. & St. L. east and West; at Canal Dover with C., L. & W and C. & P., north and east; at Valley Junction with W. & L. E. and Valley R'y.

W. K. RICHARDS, Gen. Pass. Agt
A. T. WICKOFF, Gen. Manager.

½ to 6 in.	11½
¼ to 9-32 and 1⅛ to 7 in	12
3-6 in	14

Flats.

	cts. lb
2 to 9-16 wide by 2 to ⅝ thick	0

Bessemer and O. H. Steel.

	cts. lb.
Machinery base price.	02¾
Tire "	02¾
Spring "	03¼
Sleigh Shoe "	02¾
Toe Calk "	03
Cutter Shoes, tapered and burr "	03

For extra sizes, see classification below.

Machinery Steel.

ROUNDS AND SQUARES.

	cts. per lb ex.
1 to 3 in. incl.	base
3⅛ to 4 "	0.3
4⅛ to 6 "	1.0
¾ to 15-16 "	0.2
¼ to 11-16 "	0.3
⅜ to 7-16 "	0.4
5-16 to 11-32 "	0.5
¼ and 9-32 "	0.7
Machine cutting, specified lengths, ab'e 24 in.	0.2
Machine cutting, specified lengths, 12 to 24 in.	0.4

Machine cutting to specified lengths less than 12 inches, according to contract, but not less than 0.6 cents on each size extra. Sawing, one-half of the above extra for cutting.

FLATS.

	cts. per lb ex.
1¼ to 6 in., by 5-16 to 1 in. thick	base
1¼ to 6 in., by ¼ and 9-32 in. thick	0.2
1¼ to 6 in., by 3-16 and 7-32 in. thick	0.3
1¼ to 6 in., by ⅛ and 5-32 in. thick	0.4
¾ to 1 7-19 in., by ¼ to 1 in. thick	0.3
¾ to 1 7-16 in., by 3-16 and 7-32 in. thick	0.4
¾ to 1 7-16 in., by ⅛ and 5 32 in. thick	0.5
¾ to 11-16 in., by ¼ to ½ in. thick	0.4
⅝ to 11-16 in., by 3-16 and 7-32 in. thick	0.6
⅝ to 11-16 in., by ⅛ and 5-32 in. thick	0.8
⅝ to ¾ in., by 1-16 and 3-22 in. thick	2.0
13-16 to 1⅛ in., by 1.16 and 3-32 in. thick	1.5
1¼ to 3 in., by 1-16 and 3-32 in. thick	1.0

These extras apply on Tire, Toe-Calk, Shoe and Flat Machinery Steel, also on Cutter Shoes.

SPRING STEEL FLATS.

	cts. ex.
1¼ to 4 in. by No. 4 gauge to ⅛ in. inclusive,	base
1 and 1⅛ in. by No. 1 gauge to 4 gauge "	0.2
1 to 3 in. by No. 5 gauge to 7 gauge "	0.5
⅜ to 3 in. by No. 8 gauge to 10 gauge "	1.0
¾ to 3 in. by No. 11 gauge to 16 gauge "	2.0
¾ to 3 in. by No. 17 gauge to 20 gauge "	3.5
⅜ to ⅝ in. by No. 10 gauge to 16 gauge "	4.0
⅜ to ⅝ in. by No. 17 gauge to 20 gauge "	5.0
⅜ to ⅝ in. by No. 21 gauge to 24 gauge "	6.0

Bessemer and Open Hearth cut to length, 24 nch and over 1-10 cent per lb. extra, and under, y special contract.

ROUND SPRING STEEL.

	cts. ex
⅝ to 1¼ inches	base
⅛ to 9-16 inches	0.2
⅜ to 7-16 inches	0.5
5-16 inches	1.0
¼ inches	1-5

English Tool Steel.

Jessops	16c
Hob on's "Best"	16c
" "Choice"	36c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	4 00
Bridge ½, ⅝, 11-16 and ¾ inch diam	4 00

Rolls and Castings.

Furnace floor and straightening plates	1¼c
Housings and castings not otherwise specified	1¾c
Guide plates	2½c
Spindles and coupling boxes	1¾c
Sand rolls and pinions, large size	2 c
Sand rolls and pinions, small size	2½c
Pipe mill castings	3 c
Rolling mill castings under 50 lb	2 c
Spur and bevel wheels, large	3 c
Spur and bevel wheels, small	3½c
Pulleys up to 30 inches	4 c
Pulleys over 30 inches	3½c
Engine castings, light	3½c
Engine castings, heavy	2½c

SCRAP IRON AND OLD METAL

	Net Ton.
No. 1 R. R. wrought scrap	$23 00
No. 1 wrought scrap	20 00
No. 1 Machine cast scrap	15 00
Stove plate (free from burnt iron)	10 50
Grate bars	11 00
Pipes and flues (Clean)	13 00
Tank iron	12 50
Hoop and band iron	10 00
Iron axles	28 00
Light sheet iron	10 00
Axle turnings	16 00
Wrought turning (free from cast)	15 00
Wrought iron, oily drillings	14 00
Cast borings	11 00
Malleable iron	10 50
Uncut wrought iron boilers	10 00
Steel boiler plates	14 50
Old iron T rails gross tons	$27 00
Old steel rails	23 00
Car wheels	20 00
Old copper per lb	7
No. 1. H. red Brass	8¼
Heavy yellow brass	6½
Light yellow Brass	6
Scrap Zinc	3
Tea Lead	3
Heavy Lead	3¼

WROUGHT IRON PIPE.

DISCOUNTS.

	Discount Per Ct.
Wrought iron pipe: Butt black X str	
XX str	55
Wrought iron pipe: Lap black X str	
XX str	65
Wrought iron pipe: Butt galv	45
" " Lap "	50
Lap-welded boiler tubes	50
" drive pipe	
" casing	
Lead pipe per lb	
Sheet lead "	
Galvanized spiral pipe	50
" " fittings	30
Patent adjustable ells	40
Globe ventilators	60
Tin tubing	50
Fittings for same	30
Expanding conductor pipe and fittings	40
Cast iron piece fittings for wrought iron pipe, black and galv	70
Bushings and plugs	75

Malleable unions	65
" flange unions	72½
Long screws	70
Gas pipe hooks	50
Cast iron flanges, manifolds and expansion pipe hangers	65
Hook, ring and expansion plates, coil stands	67½
Iron body: Globe, angle, check, cross, safety, butterfly, throttle, back pressure and foot valves	65&10
Iron body: Expansion joints and iron cocks, all iron	65&10
Iron body: Iron cocks with brass plugs	60&10
Straight way valves	
Brass: Globe, angle, check, cross safety, and radiator valves	60&10
Throttle and butterfly valves	5 &10
Brass: Fin. globe valves, with finished brass wheels	40&10
Brass: Steam, service, meter and union meter cocks	57½&10
Brass: Expansion joints and steam bibbs	50&10
Mississippi gauge cocks	55
Bingham "	
Gas proving pumps	50
Oil cups, lubricators and air cocks	60&10
Cocks for steam gauges	60&10
Cylinder cocks	50&10
Comp. gauge cocks	5&10
Water gauges, steam whistles and whistle valves	60&50
Gas fixture fittings	50
McNamara hydrants and street washers	Spec'l
Stop cock boxes	Spec'l
Galvanized wrought iron range boilers, to 52 gallons	65
Galvanized wrought iron range boilers, larger	50
Stands for same	40
Copper bath tubs	20
Closets	Spec'l
Cast iron soil pipe, to 6 in. inclusive	60
" " fittings, to 6 in. inclusive	60&5
Cast iron sinks	70
" slop sinks	60
Drive-well points	50
Ground key work:	
Rough and fin. plain, tray and bath bibbs } " " stops, shower stops, hydrant and ball cocks }	55&10
Compression:	
Rough and fin. plain, tray and bath bibbs	50&10
" " stops; urinal, hopper, hydrant and ball cocks	50&10
Basin cocks, from No. 1 to 13 inclusive	50&10
" " above No, 13, and double basin	40&10
Shampooing and sink cocks	40&10
Pantry cocks	50&10
Shampooing sprinklers	50&10
Double bath cocks and chain stays	50&10
Hose goods, plain and water back couplings	55&10
Boiler couplings, ground face, per set net, $1.25	10
Boiler couplings plain face, per set net, $1.20	10
Basin plugs and grates; bath, sink and wash tray plugs	60&10
Soldering nipples and unions	65&10
Union joints	60&10
End ferrules; street washer screws, checks and guides	55&10
Hydrant and basin clamps, hydrant sockets	55&10
Pipe taps, reamers and dies	60
Plain pipe tongs and gas plyers	50
Wrenches: Coe	50 & 5
" Girard agricultural	65
" " standard	60 & 5
" Stillson	33⅓
" Armstrong	25 & 5
" Bemis & Call	25 & 5
" Rouse	30
" Bauer's	10
Pipe tongs: Brown's adjustable	50
" Jarecki	50
" Robbins' chain	10
" Brock's	10
Vises: Plain pipe	55
" Smith comb	50
" Parker's comb	50
" Bauer's pipe and bolt	10
Machinists' Hammers	40
Copper "	Spec l
Pipe cutters: Stanwood	20
" Eureka	45
" Saunders	40
" Barnes	50 & 5
Malleable oilers and hand lamps	Spec l
Screwing stocks	60
Armstrong's adjustable stocks and dies	25&10
Waste, at manufacturer's prices.	
Gas fitters' cement	Spec'l
Hair felt	Spec'l
Riley Bros. cement	Spec'l
Otley Bros. steam packing	Spec'l
Mineral wool	Spec'l
Lubricating compound	Spec'l
Malleable iron fittings, black and galv	25
Wrought iron couplings and nipples, black and galv	70

Standard Wrought Iron, Steam, Gas and Water Pipe.

Nominal Size Inside Diameter.	Price per Foot, Black.	Price per Foot, Galvanized.	Thickness.	Nominal Weight per Foot	No. of Threads per in. of Screw	Price, Extra Threads.
In.			In.	Lbs.		
⅛	0 04	0 05	.068	0 24	27	0 05
¼	0 04	0 05	.088	0 42	18	0 05
⅜	0 04	0 05½	.091	0 56	18	0 05
½	0 05	0 07	.109	0 84	14	0 05
¾	0 07	0 09	.113	1 12	14	0 05
1	0 09½	0 12½	.134	1 67	11½	0 06
1¼	0 12½	0 17	.140	2 24	11½	0 07
1½	0 22	0 25	.145	2 68	11½	0 08
2	0 28	0 32	.154	3 61	11½	0 10
2½	0 44	0 49	.204	5 74	8	0 15
3	0 58	0 64	.217	7 54	8	0 20
3½	0 70	0 86	.226	9 00	8	0 25
4	0 85	1 00	.237	10 66	8	0 35
4½	1 00	1 25	.246	12 49	8	0 45
5	1 20	1 50	.259	14 50	8	0 55
6	1 65	2 00	.280	18 76	8	0 70
7	2 00		.301	23 27	8	0 85
8	2 75		.322	28 18	8	1 00
9	3 70		.344	33 70	8	1 20
10	4 75		.366	40 06	8	1 25
11	5 75		.375	45 02	8	1 50
12	6 50		.375	49 00	8	2 50
13	7 75		.375	54 00	8	
14	9 00		.375	58 00	8	
15	10 00		.375	62 00	8	

Extra Strong, double above list.

Double Extra Strong, double list of Extra Strong.

LAP-WELDED BOILER TUBES.

Size, Outside Diameter: inches	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4	4½	5	5 3-16	5½	6	6½	7	7½	8	8½	9	9½
Price per foot	23	23	23	22	22	25	28	31	34	38	43	45	52	60	66	1 00	1 00	1 30	1 45	1 85	2 25	2 75	3 25	3 55
Price, Lap-Welded Drive Pipe	8	10	12		15								60	72		1 00	1 20		1 65	2 20	2 80	3 00		4 50

DRIVE PIPE SHOES.

	6"	8"	10"	12"
Long, Separate	13 00	15 00	20 00	25 00
" Shrunk on pipe	16 00	18 00	25 00	30 00
Short, Separate	12 00	14 00	17 00	22 00
" Screwed on pipe	13 00	15 00	19 00	24 00

DRIVE PIPE HEADS.

	12 00	15 00	18 00	22 00

LAP-WELDED CASING.

Size, Inside Diameter Nominal	2	2¼	2½	2¾	3	3¼	3½	4	4¼	4½	5	5 3-16	5½	6	6½	7	7½	8	8½	9	9½
Price, per foot	25	28	31	34	38	43	45	52	56	61	72	86	1 00	1 30	1 45	1 85	2 10	2 25	2 75	3 00	3 25

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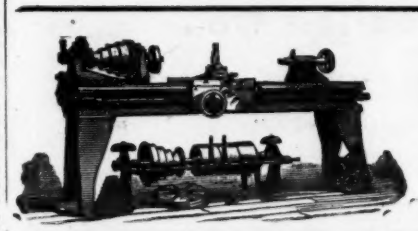

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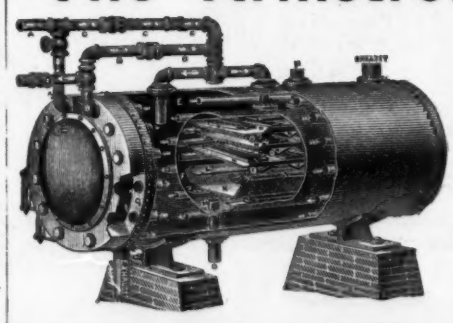

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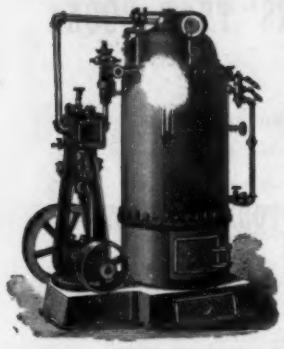

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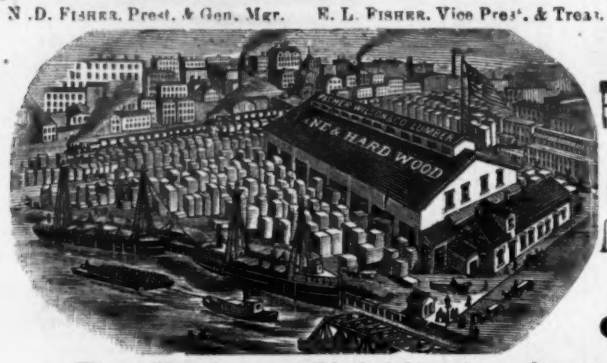

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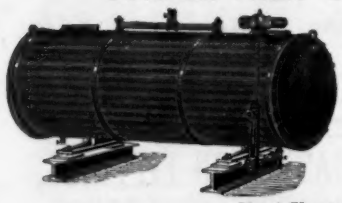

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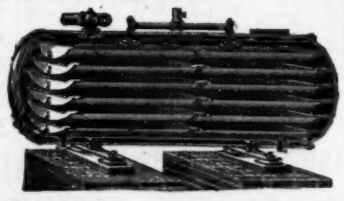

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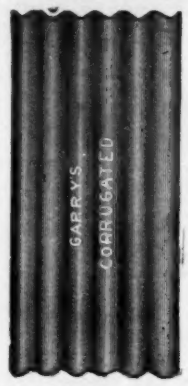

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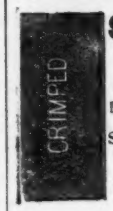

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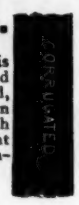

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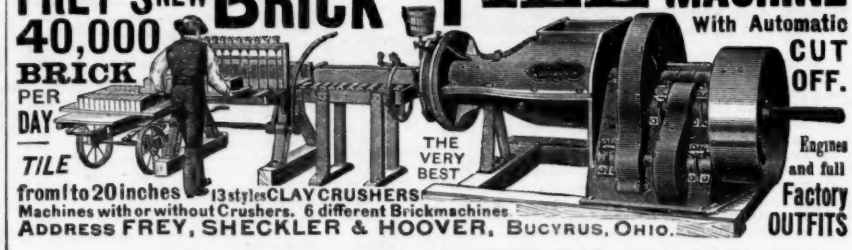

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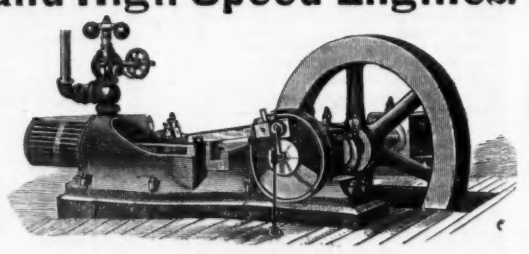

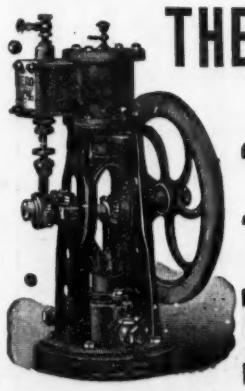

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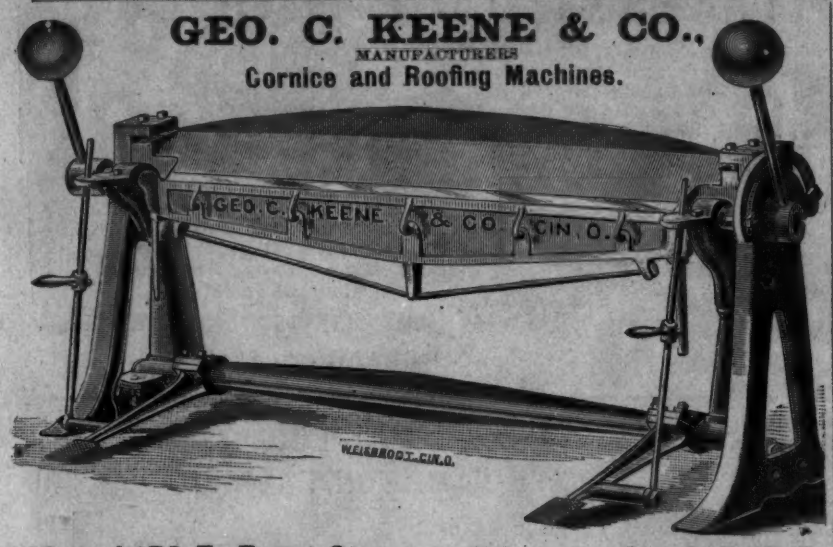

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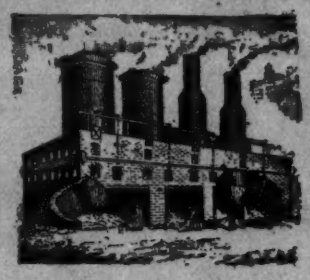

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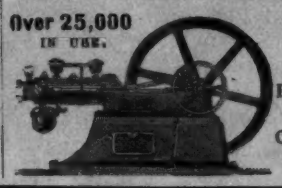

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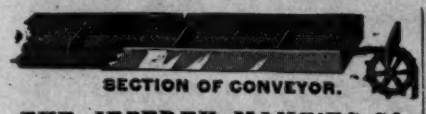

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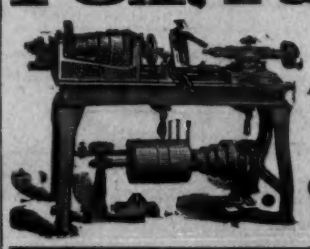

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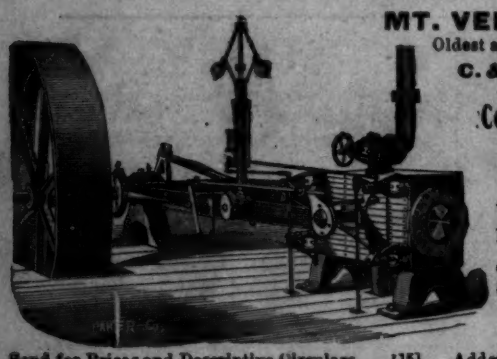

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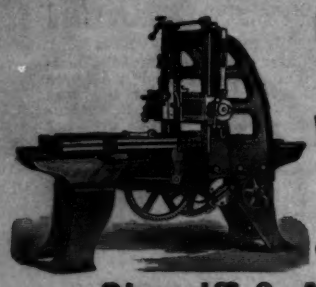

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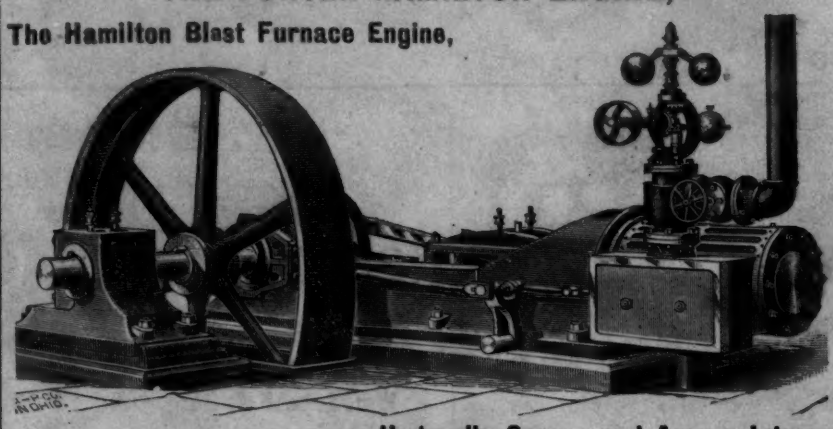

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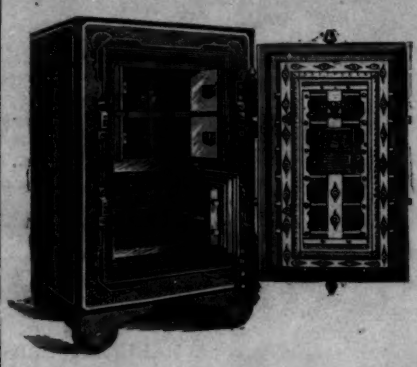

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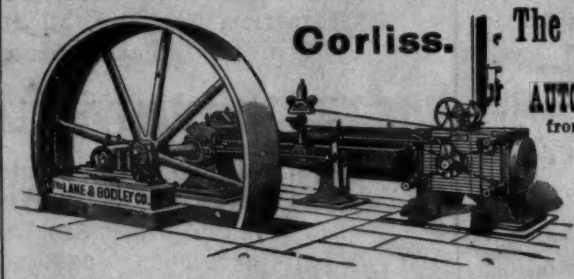

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